(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 434 608 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
02.04.1997 Bulletin 1997/14

(51) Int Cl.[6]: **C08K 5/3492**, C08K 5/34, C07D 251/24
// (C08K5/34, 5:3435, 5:3492)

(21) Application number: **90810920.0**

(22) Date of filing: **27.11.1990**

(54) **Stabilized organic material**

Stabilisiertes organisches Material

Matière organique stabilisée

(84) Designated Contracting States:
AT BE CH DE ES FR GB IT LI NL

(30) Priority: **05.12.1989 US 446369**

(43) Date of publication of application:
26.06.1991 Bulletin 1991/26

(73) Proprietor: **Ciba Specialty Chemicals Holding Inc.**
4057 Basel (CH)

(72) Inventors:
- **Birbaum, Jean-Luc, Dr.**
  CH-1700 Fribourg (CH)
- **Rody, Jean, Dr.**
  CH-4125 Riehen (CH)
- **Slongo, Mario, Dr.**
  CH-1712 Tafers (CH)
- **Valet, Andreas, Dr.**
  W-7859 Eimeldingen (DE)
- **Winter, Roland A. E., Dr.**
  Armonk, New York 10504 (US)

(56) References cited:
EP-A- 0 200 190 **CH-A- 484 695**

Remarks:
The file contains technical information submitted after the application was filed and not included in this specification

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Printed by Jouve, 75001 PARIS (FR)

Description

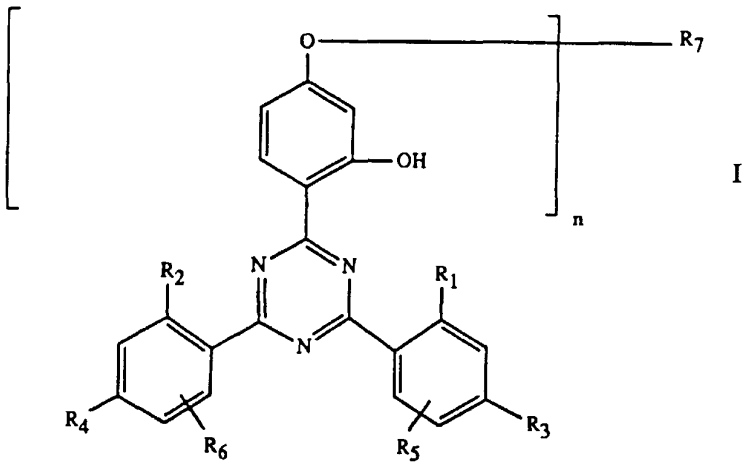
The present invention relates to an organic material containing, as stabilizers, a mixture of a sterically hindered amine and an o-hydroxyphenyl-s-triazine, and to novel o-hydroxyphenyl-s-triazine.

It is already known from US-Patent 4,619,956 that polymers can be stabilized against the action of light, moisture and oxygen by adding a mixture of a sterically hindered amine and an o-hydroxyphenyl-s-triazine. The triazines used in this context contain at least one phenyl group carrying a hydroxyl group in the o-position.

Triazine compounds of this type are relatively sparingly soluble in many substrates and tend to migrate. In accordance with the present invention, similar triazine derivatives which have an improved compatibility with or solubility in organic polymers are used.

The invention relates to an organic material which has been stabilized against damage caused by light, heat and oxygen and which contains

(a) at least one sterically hindered amine of the polyalkylpiperidine type and
(b) at least one o-hydroxyphenyl-s-triazine, wherein the triazine compound (b) is a compound of the formula I

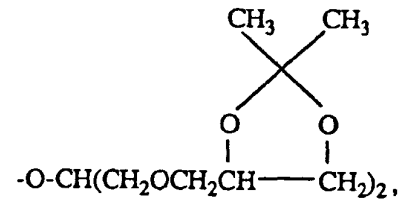


I

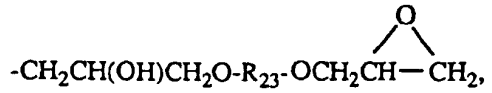
in which n is 1 to 4,

R_1 and R_2 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl or trifluoromethyl,
R_3 and R_4 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl, C_1-C_{18}-alkoxy or halogen and, in the event that n = 1, can also be a radical -OR_7,
R_5 and R_6 independently of one another are H, C_1-C_{12}alkyl or halogen,
R_7, if n is 1, is

a) C_1-C_{18}alkyl which is substituted by one or more of the groups OH, C_1-C_{18}alkoxy, C_3-C_{18}alkenoxy, halogen, phenoxy (which is unsubstituted or substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen), furyloxy,



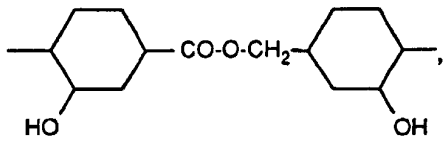
-COOH, -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, -NHR_9, -$N(R_9)(R_{10})$, -$NHCOR_{11}$, -CN and/or by -O-CO-R_{11},
b) C_4-C_{50}alkyl which is interrupted by one or more O and can be substituted by OH or/and glycidyloxy,
c) C_3-C_6alkenyl,
d) glycidyl or a group



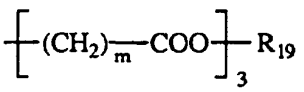
e) cyclohexyl which is unsubstituted or substituted by OH or -$OCOR_{11}$,
f) C_7-C_{11}phenylalkyl which is unsubstituted or substituted by OH, Cl or CH_3,
g) -CO-R_{12} or
h) -SO_2-R_{13},

and if n is 2,
R_7 is

a) C_2-C_{16}alkylene,
b) C_4-C_{12}alkenylene,
c) xylylene,
d) C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH,
e) a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CO-NH-R_{17}-NH-CO- or -$(CH_2)_m$COO-R_{18}-OOC-$(CH_2)_m$- (in which m is 1 to 3) or

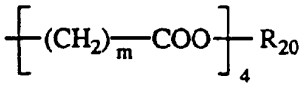


and if n is 3, R_7 is a group



m = 1-3,

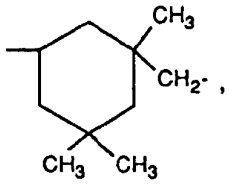
and if n is 4,
R_7 is a group



m = 1-3,

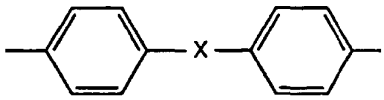
R_8 is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by one or more O, N or S and/or substituted by OH, C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$, -$N(R_9)(R_{10})$ or -$OCOR_{11}$ and/or OH, C_3-C_{18}alkenyl, glycidyl or C_7-C_{11}phenylalkyl,
R_9 and R_{10} independently of one another are C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or R_9 and R_{10} together are C_3-C_9alkylene or C_3-C_9oxaalkylene or C_3-C_9azaalkylene,

R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,
R_{12} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl, phenyl, C_1-C_{12}alkoxy, phenoxy, C_1-C_{12}alkylamino or C_6-C_{12}arylamino or a group -R_{24}-COOH or -NH-R_{17}-NCO,
R_{13} is C_1-C_{12}alkyl, C_6-C_{12}aryl or C_7-C_{14}alkaryl,
R_{14} is C_1-C_{12}alkyl or phenyl,
R_{15} is C_2-C_{10}alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, phenylene or a group -phenylene-X-phenylene- in which X is -O-, -S-, -SO_2-, -CH_2- or -$C(CH_3)_2$-,
R_{16} is C_2-C_{10}alkylene, C_2-C_{10}oxaalkylene or C_2-C_{10}thiaalkylene, C_6-C_{12}arylene or C_2-C_6alkenylene,
R_{17} is C_2-C_{10}alkylene, phenylene, tolylene, diphenylenemethane or a group

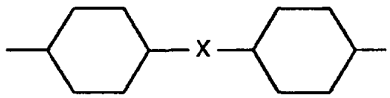


.

R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by one or more O,
R_{19} is C_3-C_{12}alkanetriyl,
R_{20} is C_4-C_{12}alkanetetryl,
R_{23} is C_2-C_{10}alkylene, phenylene or a group



or

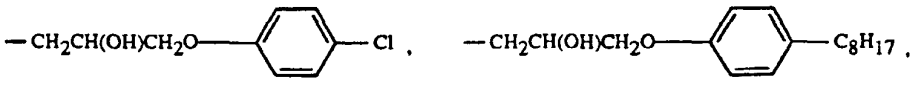


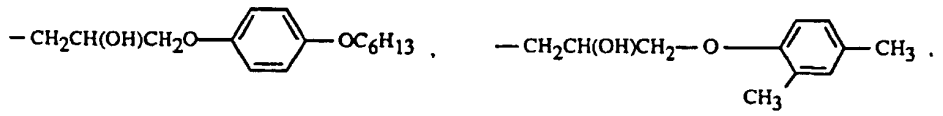
wherein X is O, S, SO_2, CH_2 or $C(CH_3)_2$, and
R_{24} is C_2-C_{14}alkylene, vinylene or o-phenylene.

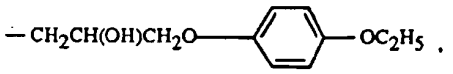
If one of the substituents in formula I is C_1-C_{12}alkyl, it can be unbranched or branched alkyl, for example methyl, ethyl, propyl, isopropyl, n-butyl, i-butyl, s-butyl or t-butyl, pentyl, hexyl, heptyl, octyl, 2-ethylhexyl, di-t-octyl, nonyl, decyl, undecyl or dodecyl. As C_1-C_{18}alkyl, R_8, R_{11} and R_{12} can additionally be, for example, tetradecyl, hexadecyl or octadecyl.

As C_1-C_{18}alkoxy, R_3 and R_4 are preferably C_1-C_{12}alkoxy. The alkoxy radical is preferably unbranched. Examples of these are methoxy, ethoxy, propoxy, butoxy, hexyloxy, octyloxy, decyloxy or dodecyloxy.

As substituted C_1-C_{12}alkyl, R_7 can be substituted by one or more of the groups OH, C_1-C_{18}alkoxy, halogen, phenoxy which is unsubstituted or substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen, -COOH, -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, -NHR_9, -$NH(R_9)(R_{10})$, -$NHCOR_{11}$, -CN or -$OCOR_{11}$. The following groups are examples of such substituted alkyl groups: -CH_2CH_2OH, -$CH_2CH(OH)CH_3$, -$CH_2CH(OH)C_2H_5$, -$CH_2CH(OH)C_6H_{13}$, -$CH_2CH(OH)C_{10}H_{21}$, -$CH_2CH_2OCH_3$, -$CH_2CH_2OC_2H_5$, -$CH_2CH_2OC_4H_9$, -$(CH_2)_3OH$, -$CH_2CH(OH)CH_2OC_4H_9$, -$CH_2CH(OH)CH_2OC_{12}H_{25}$, -$CH_2CH_2O$phenyl, -$CH_2CH_2Cl$ -$CH_2CH(OH)CH_2O$phenyl,







-CH_2COOH, -CH_2CH_2COOH, -$CH_2COOC_2H_5$, -$CH_2COOC_8H_{17}$, -$CH_2CH_2COOCH_3$, -$CH_2CH_2COOC_4H_9$, -$CH_2CH_2COOC_{12}H_{25}$, -CH_2CONH_2, -$CH_2CONHC_4H_9$, -$CH_2CON(C_4H_9)_2$, -$CH_2CH_2CONHC_{12}H_{25}$, -$CH_2CH_2CON(C_2H_5)_2$, -$CH_2CH_2NH_2$, -$CH_2CH_2N(CH_3)_2$, -$(CH_2)_3$-NH_2, -$(CH_2)_3$-NHC_4H_9, -$(CH_2)_3N(CH_3)_2$, -$(CH_2)_3N(C_2H_5)_2$, -$(CH_2)_3NHCOCH_3$, -$(CH_2)_3NHCOC_7H_{15}$, -CH_2CH_2CN, -$CH_2CH_2OCOC_3H_7$, -$CH_2CH_2OCOC_{17}H_{35}$, -$CH_2CH(CH_3)$-$OCOCH_3$, -$CH_2CH(OCOCH_3)CH_2OC_8H_{17}$ or -$CH_2CH(OCOC_7H_{15})CH_2O$phenyl.

As C_3-C_6alkenyl, R_7 can, for example, be allyl, methallyl or 2-butenyl. As C_3-C_{18}alkenyl, R_8 can additionally also be, for example, octenyl, dodecenyl or oleyl. As C_2-C_{18}alkenyl, R_{11} and R_{12} can additionally also be vinyl.

As C_7-C_{11}phenylalkyl which is unsubstituted or substituted by OH, Cl or CH_3, R_7 and R_8 can, for example, be phenylethyl, 2-hydroxy-2-phenylethyl, 2-phenylpropyl, 3-phenylpropyl, 4-chlorobenzyl or 4-methylbenzyl, but especially benzyl.

As C_2-C_{16}alkylene, R_7 can be unbranched or branched alkylene, for example di-, tri-, tetra-, hexa-, octa-, deca- or dodeca-methylene, 2,2-dimethyl-prop-1,3-ylene or 1,2-propylene. As C_4-C_{12}alkenylene, R_7 can, in particular, be 2-buten-1,4-ylene. As C_3-C_{20}alkylene which is interrupted by O and/or substituted by OH, R_7 can, for example, be one of the groups -$CH_2CH(OH)CH_2$-, -$CH_2CH_2OCH_2CH_2$- or -$CH_2CH(OH)CH_2O$-$(CH_2)_x$-$OCH_2CH(OH)CH_2$- in which x = 2 - 10.

As C_3-C_{20}alkyl which is interrupted and/or substituted by OH, R_8 can, in particular, be alkyl which is substituted by OH or alkyl which is interrupted by O and substituted by OH. Examples of these are the groups -CH_2CH_2OH, -$CH_2CH(OH)CH_3$, -$CH_2CH(OH)C_6H_{13}$, -$CH_2CH_2OC_4H_9$, -$CH_2CH_2OCH_2CH_2OH$ or -$CH_2CH_2(OCH_2CH_2)_pOH$ in which p = 2 - 9.

As C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$, -$N(R_9)(R_{10})$ or -$OCOR_{11}$, R_8 can, for example, be -$CH_2CH_2P(O)(OC_2H_5)_2$, -$CH_2P(O)(OC_6H_{13})_2$, -$CH_2CH_2N(CH_3)_2$, -$CH_2CH_2CH_2N(C_2H_5)_2$, -$CH_2CH_2OCOC_7H_{15}$ or -$CH_2CH_2OCOCH=CH_2$.

As C_3-C_{12}alkoxyalkyl, R_9 and R_{10} can, in particular, be 2-(C_1-C_{10}alkoxy)-ethyl, for example 2-methoxyethyl, 2-butoxyethyl or 2-octyloxyethyl. As C_4-C_{16}dialkylaminoalkyl, R_9 and R_{10} can, for example, be 2-dibutylaminoethyl, 2-diethylaminoethyl or 3-dimethylaminopropyl.

As C_5-C_{12}cycloalkyl, R_9 and R_{10} can, for example, be cyclopentyl, cyclooctyl or cyclododecyl, but especially cyclohexyl. If R_9 and R_{10} together are C_3-C_9alkylene, C_3-C_9oxaalkylene or C_3-C_9azaalkylene, they form, together with the N atom to which they are attached, a heterocyclic ring, for example a pyrrolidine, piperidine, 2,6-dimethylpiperidine, morpholine, dimethylmorpholine or piperazine ring.

As C_1-C_{12}alkoxy, R_{12} can, for example, be methoxy, ethoxy, butoxy, hexyloxy, octyloxy, decyloxy or dodecyloxy.

As C_1-C_{12}alkylamino or C_6-C_{12}arylamino, R_{12} can, for example, be hexylamino, dodecylamino, phenylamino, naphthylamino or biphenylylamino.

As C_2-C_{10}alkylene, R_{16}, R_{17} and R_{18} can be unbranched or branched alkylene, for example 1,2-ethylene, tri-, tetra-, penta-, hexa-, octa- or deca-methylene, 1,2-propylene or 2,2-dimethyltrimethylene, while as oxaalkylene or thiaalkylene, R_{16} can, for example, be 2-oxatrimethylene, 3-oxapentamethylene, 3-thiapentamethylene or 2-thiatrimethylene. As C_2-C_6alkenylene, R_{16} can, in particular, be -CH = CH-.

As C_6-C_{12}arylene, R_{16} and R_{17} can, for example, be phenylene, naphthylene or biphenylene. As C_7-C_{15}alkylarylene, R_{17} can, in particular, be tolylene.

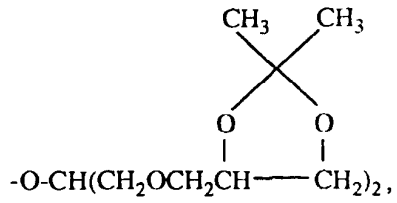
As C_4-C_{20}alkylene which is interrupted by O, R_{18} can be interrupted by 1 - 9 O atoms and can, in particular, be the divalent radical formed by removing the two hydroxyl groups from a polyethylene glycol or polypropylene glycol.

In the substituents, aryl on its own or in combined radicals is preferably phenyl, naphthyl or biphenylyl.

Compounds of the formula I which are preferred as the component (b) are those in which n is 1 to 4, R_1 and R_2 independently of one another are H, OH or C_1-C_4alkyl, R_3 and R_4 independently of one another are H, OH, C_1-C_4alkyl, C_1-C_4alkoxy, halogen or a radical -OR_7, R_5 and R_6 independently of one another are H or C_1-C_4alkyl,

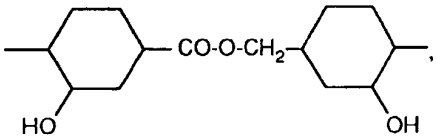
R_7, if n is 1, is

a) C_1-C_{18}alkyl which is substituted by one or more of the groups OH, C_1-C_{18}alkoxy, allyloxy, phenoxy, furyloxy,

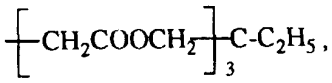


-$COOR_8$, -$CON(R_9)(R_{10})$ and/or by -$OCOR_{11}$,
b) C_4-C_{50}alkyl which is interrupted by one or more O and can be substituted by OH or/and glycidyloxy,
c) allyl, glycidyl or benzyl,
d) cyclohexyl or hydroxycyclohexyl,

and if n is 2, R_7 is C_4-C_{12}alkylene, C_4-C_6alkenylene, xylylene, C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH, or R_7 is a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CH_2-COO-R_{18}-OOC-CH_2-or

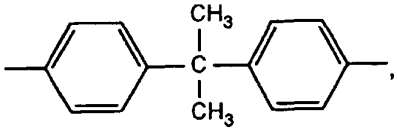


and if n is 3, R_7 is a group



and it n is 4, R_7 is a group

R_8 is C_1-C_{12}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by one or more O and/or substituted by OH or
R_8 is C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$,
R_9 and R_{10} are C_1-C_6alkyl or R_9 and R_{10} together are pentamethylene or 3-oxapentamethylene,
R_{11} is C_1-C_{12}alkyl, C_2-C_5alkenyl or phenyl,
R_{14} is C_1-C_{12}alkyl,
R_{15} is C_2-C_8alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, or is a group



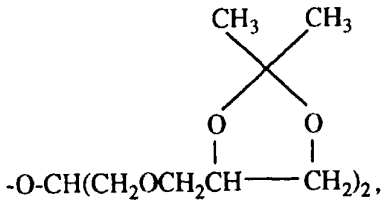
R_{16} is C_2-C_8alkylene, C_2-C_6oxaalkylene or C_2-C_6thiaalkylene and R_{18} is C_4-C_8alkylene or C_4-C_{12}alkylene which is interrupted by one or more O.

R_1 and R_2 are preferably hydrogen, chlorine or C_1-C_4alkyl, particularly hydrogen or methyl. R_3 and R_4 are preferably hydrogen, chlorine or C_1-C_4alkyl, particularly hydrogen, chlorine or methyl. R_5 and R_6 are preferably hydrogen.

Compounds of the formula I which are particularly preferred as component (b) are those in which n is 1, 2 or 4, R_1 and R_2 independently of one another are H or CH_3, R_3 and R_4 independently of one another are H, CH_3 or Cl, R_5 and R_6 are hydrogen,

R_7, if n is 1, is

a) C_1-C_{14}alkyl which is substituted by one or more of the groups OH, C_1-C_{15}alkoxy, allyloxy, phenoxy, furyloxy,



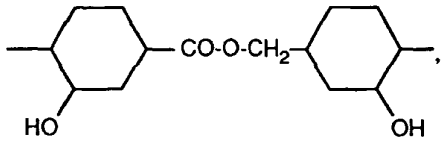
-$COOR_8$, -$CON(R_9)(R_{10})$ and/or by -$OCOR_{11}$,

b) C_6-C_{45}alkyl which is interrupted by one or more O and can be substituted by OH or/and glycidyloxy,

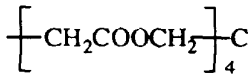
c) glycidyl or

d) hydroxycyclohexyl,

and if n is 2, R_7 is C_6-C_{12}alkylene, 2-butenylene-1,4, xylylene, C_3-C_{20}alkylene which is interrupted by one or more O or substituted by OH, or R_7 is a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CH_2-COO-R_{18}-OOC-CH_2-or



and if n is 4, R_7 is



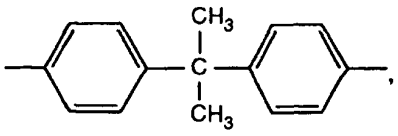
R_8 is C_4-C_{10}alkyl, oleyl, C_3-C_{20}alkyl which is interrupted by one or more O and/or substituted by OH, or R_8 is -$CH_2P(O)(OR_{14})_2$,

R_9 and R_{10} are C_2-C_6alkyl

R_{11} is C_6-C_{10}alkyl, C_2-C_3alkenyl

R_{14} is C_1-C_{12}alkyl,

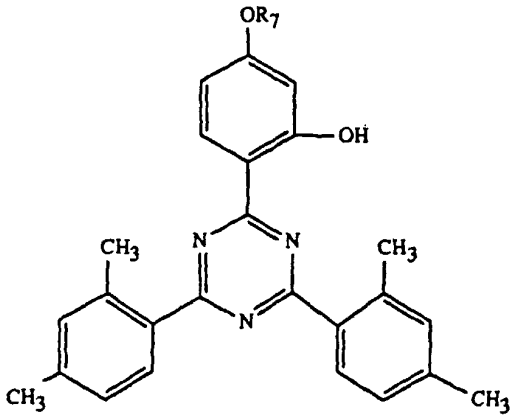
R_{15} is C_2-C_8alkylene, C_{10}-C_{45}alkylene which is interrupted by more than one 0, or is a group



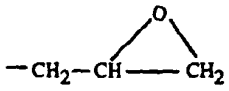
R_{16}, is C_4-C_8alkylene and R_{18} is C_4-C_8alkylene.

A further preferred group of compounds of the formula I is formed by those in which n is 1 or 2 and, if n is 1, R_7 is a group $-CH_2CH(OH)CH_2-OR_{21}$ in which R_{21} is C_1-C_{18}alkyl, allyl, phenyl, furyl, C_6-C_{12}-alkanoyl or C_3-C_5alkenoyl and, if n is 2, R_7 is a group $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$ in which R_{15} is as defined above.

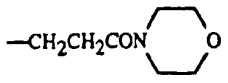
The following compounds are examples of individual compounds of the formula I



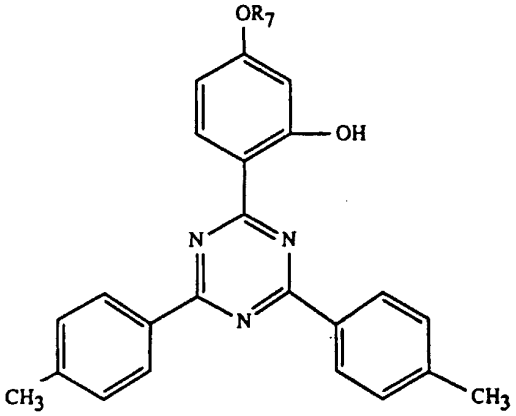
R_7 = CH_2 phenyl
$-CH_2CH_2OH$
$-CH_2CH_2OCOCH_3$
$-CH_2CH_2OCOCH=CH_2$
$-CH_2CH(OH)CH_2OC_8H_{17}$
$-CH_2CH(OH)CH_2O(CH_2)_{12\text{-}14}CH_3$
$-CH_2CH(OH)CH_2O$ phenyl
$-CH_2CH(OH)CH_2OCOC(CH_3)=CH_2$



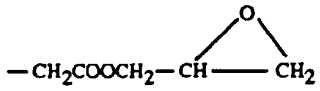
$-CH_2COOH$
$-CH_2CH_2COOC_4H_9$
$-CH_2COOC_8H_{17}$
$-CH_2COO(CH_2CH_2O)_7H$
$-CH_2COOCH_2CH(OH)CH_2OCOCH=CH_2$
$-CH_2COOCH_2CH(CH_3)OCH_2CH(CH_3)OCH(CH_3)CH_3$
$-CH_2COOCH_2P(O)(OC_2H_5)_2$
$-CH_2COOCH_2CH(OH)CH_2P(O)(OC_4H_9)_2$
$-CH_2COO(CH_2)_7CH=CHC_8H_{17}$
$-CH_2COOCH_2CH_2OCH_2CH_2OC_6H_{13}$
$-CH_2CON(C_2H_5)_2$



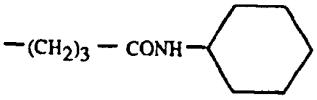
-$CH_2CONHCH_2CH_2CH_2N(CH_3)_2$
-$CH_2CONHC_8H_{17}$
-$CH_2CON(C_8H_{17})_2$

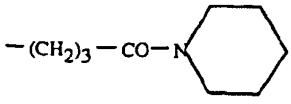


R_7 = -$CH_2COOC_2H_5$
-$CH_2COOCH_2CH_2OCH_3$
-CH_2COOCH_2CH=CH-phenyl
-$CH_2CH(OH)CH_2O(CH_2)_{12\text{-}14}CH_3$

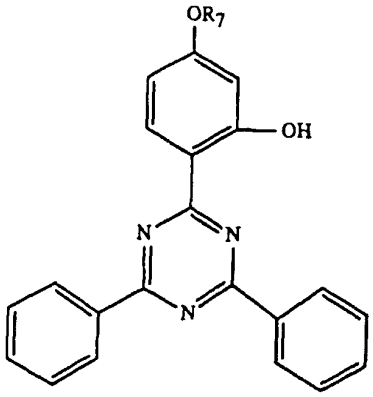


-$CH_2COOCH_2CH(OH)CH_2OC_8H_{17}$
-CH_2phenyl
-CH_2CH=CH_2
-$CH_2CON(C_4H_9)_2$
-$CH_2CH_2CONHC_8H_{17}$

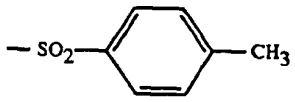




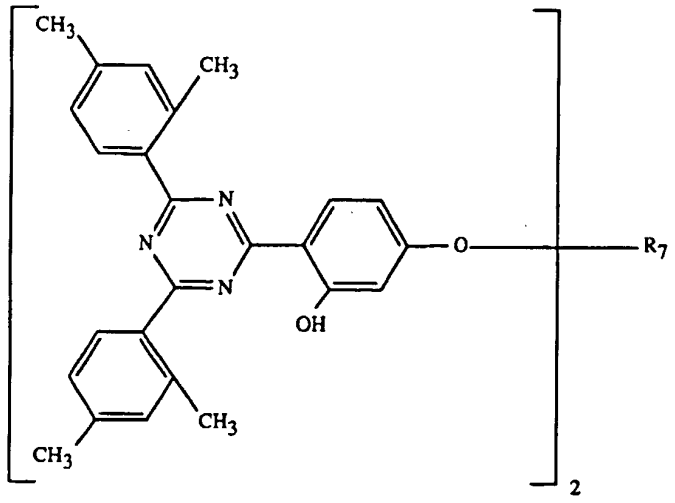
$-CO-OC_6H_{13}$
$-CH_2CH_2Cl$
$-CH_2CH_2CN$



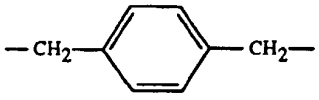
R_7 = $-CH_2CH(OH)$phenyl
$-CH_2CH(OH)CH_2O(CH_2)_{12\text{-}14}CH_3$
$-CH_2CH(OH)CH_2OCO$phenyl
$-CH_2CH(CH_3)OCOCH_3$
$-SO_2-C_{12}H_{15}$



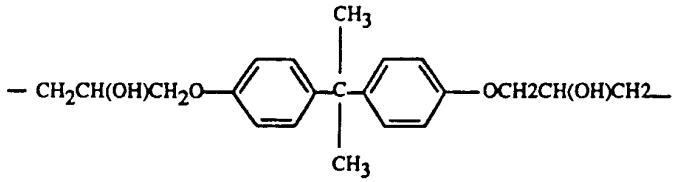
$-CH_2COOC_{10}H_{21}$
$-CH_2CONHCH_2CH_2OCH_3$
$-CH_2CH_2CONHCH_2$phenyl
$-(CH_2)_3CONH(CH_2)_3N(C_2H_5)_2$
$-CH_2CONHC_{12}H_{25}$

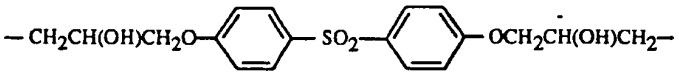


R_7 = $-CH_2CH(OH)CH_2-$

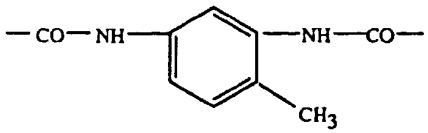


$-CH_2-CH=CH-CH_2-$
$-(CH_2)_4-$
$-(CH_2)_6-$
$-(CH_2)_8$
$-(CH_2)_{12}-$
$-CH_2CH(OH)CH_2O-CH_2CH_2-OCH_2CH(OH)CH_2-$
$-CH_2CH(OH)CH_2O-(CH_2)_6-OCH_2CH(OH)CH_2-$

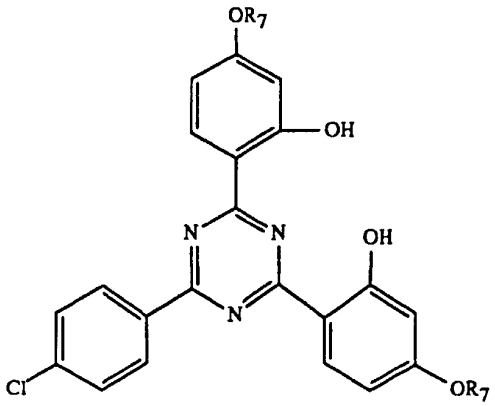




$-CH_2COO-(CH_2)_6-OCOCH_2-$

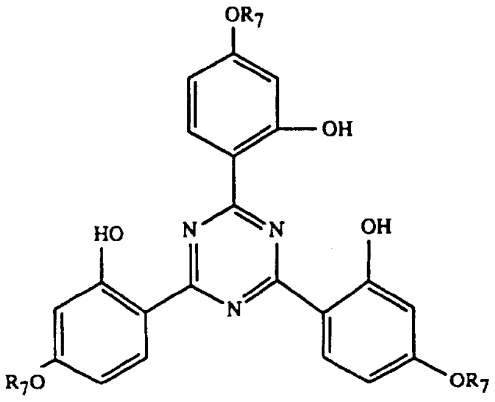


-CO-$(CH_2)_8$-CO



-

R_7 = -$CH_2CH(OH)CH_3$
-$CH_2CH_2OC_4H_9$
-$CH_2CH_2COC_2H_5$
-$CH_2COOC_8H_{17}$
-$CH_2CH(OH)CH_2OC_4H_9$
-$CH_2CH(OH)CH_2$Ophenyl

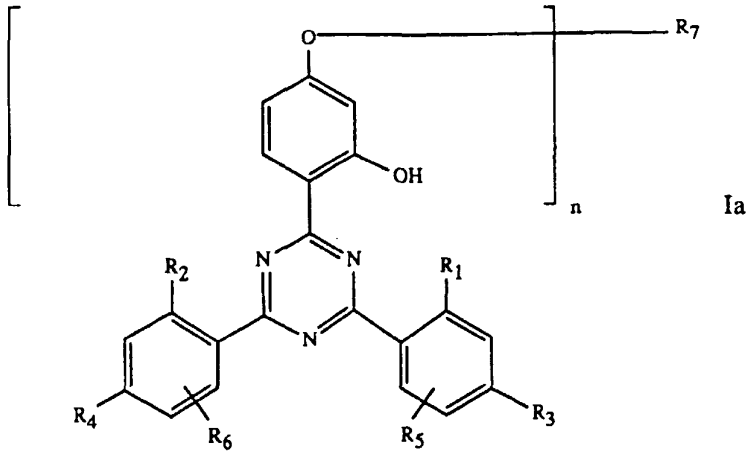


R_7 = -CH_2CH_2OH
-CH_2CH_2Ophenyl
-$CH_2COOC_6H_{13}$
-$CH_2CH_2COO(CH_2CH_2O)_3H$

$-CH_2CH(OH)CH_2OC_6H_{13}$
$-CH_2CH(OH)CH_2$phenyl

Some of the triazine derivatives of the formula I are known compounds. Many such compounds and also their preparation and their use as UV absorbers for organic materials are described in US Patents 3,244,708, 3,249,608 and 3,423,360. Their use in photographic materials is described in US Patent 3,843,371.

Another fraction of the triazine derivatives constitutes novel compounds. Compounds which are novel and are also a subject of the present invention are those of the formula Ia

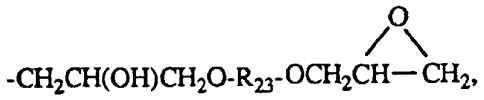


Ia

in which

n is 1 to 4,
R_1 and R_2 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl or trifluoromethyl,
R_3 and R_4 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl, C_1-C_{18}alkoxy or halogen and, in the event that n = 1, can also be a radical $-OR_7$,
R_5 and R_6 independently of one another are H, C_1-C_{12}alkyl or halogen,
R_7, if n is 1, is

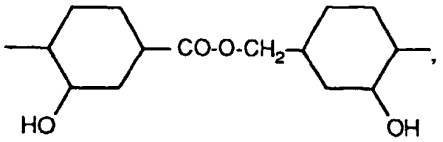
a) C_1-C_{12}alkyl which is substituted by phenoxy (which is unsubstituted or substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen) or by a group
$-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, NHR_9, $-N(R_9)(R_{10})$ or $-O-CO-R_{22}$,
b) C_4-C_{50}alkyl which is interrupted by more than one O and can be substituted by OH or/and glycidyloxy, be substituted by OH or/and glycidyloxy,
c) glycidyl or a group



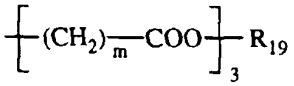
d) cylohexyl substituted by OH or $-OCOR_{11}$
e) a group $-CH_2CH(OH)CH_2OR_{21}$
f) a group $-SO_2-R_{13}$,
g) a group $-CO-R_{12}$,

and if n is 2,
R_7 is

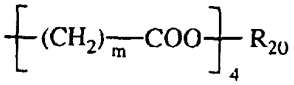
a) C_2-C_{12}alkylene,
b) C_4-C_{12}alkenylene,
c) xylylene,
d) C_3-C_{20}alkylene which is interrupted by one or more 0 and/or substituted by OH,
e) a group $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$,
$-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (wherein m is 1-3) or



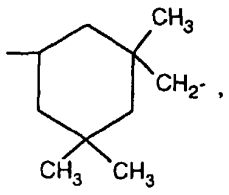
and if n is 3,
R_7 is a group



(wherein m is 1-3), and if n is 4, R_7 is a group

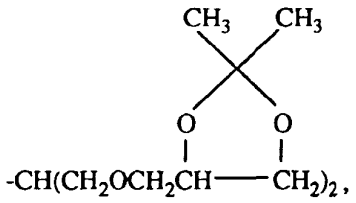


(wherein m is 1-3),
R_8 is C_3-C_{20}alkyl which is interrupted by one or more O, N or S and can be substituted by OH, or R_8 is C_1-C_4alkyl which is substituted by $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$, or $-OCOR_{11}$, or R_8 is C_3-C_{18}alkenyl, glycidyl or C_7-C_{11}phenylalkyl,
R_9 and R_{10} independently are C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or R_9 and R_{10} together are C_3-C_9alkylene or C_3-C_9-oxaalkylene or C_3-C_9azaalkylene,
R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,
R_{12} is a group $-R_{24}-COOH$ or $-NH-R_{17}-NCO$,
R_{13} is C_1-C_{12}alkyl, C_6-C_{12}aryl or C_7-C_{14}alkaryl
R_{14} is C_1-C_{12}alkyl or phenyl
R_{15} is C_2-C_{10}alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, or R_{15} is phenylene or a group -phenylene-X-phenylene- in which X is -O-, -S-, $-SO_2-$, $-CH_2-$ or $-C(CH_3)_2-$,
R_{17} is C_2-C_{10}alkylene, phenylene, tolylene, diphenylenemethane or a group

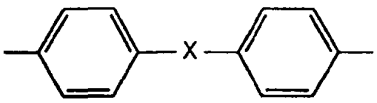


R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by one or more O,
R_{19} is C_3-C_{12}alkanetriyl,
R_{20} is C_4-C_{12}alkanetetryl,
R_{21} is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, phenyl, phenyl substituted by C_1-C_{12}alkyl, C_1-C_{12}alkoxy or halogen, or R_{21}

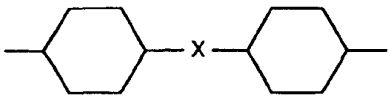
is C_2-C_{19}alkanoyl, benzoyl, C_3-C_{18}alkenoyl, furyl or a group



R_{22} is C_2-C_5alkenyl,
R_{23} is C_2-C_{10}alkylene, phenylene or a group



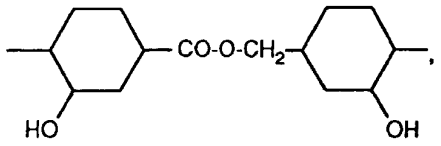
or



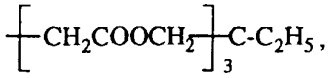
wherein X is O, S, SO_2, CH_2 or $C(CH_3)_2$, and
R_{24} is C_2-C_{14}alkylene, vinylene or o-phenylene.

Amongst these compounds of the formula Ia, preferred compounds are those in which n is 1 to 4, R_1 and R_2 independently of one another are H, OH or C_1-C_4alkyl, R_3 and R_4 independently of one another are H, OH, C_1-C_4alkyl, C_1-C_4alkoxy, halogen or a radical $-OR_7$, R_5 and R_6 independently of one another are H or C_1-C_4alkyl,

R_7, if n is 1, is C_1-C_6alkyl which is substituted by $-COOR_8$, $-COONHR_9$, $-CON(R_9)(R_{10})$ or $-OCOR_{22}$, or R_7 is glycidyl, hydroxycyclohexyl or a group $-CH_2CH(OH)CH_2OR_{21}$, and if n is 2, R_7 is C_4-C_{12}alkylene, C_4-C_6alkenylene, xylylene, C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH, or R_7 is a group $-CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, $-CH_2$-COO-R_{18}-$OOCCH_2$- or

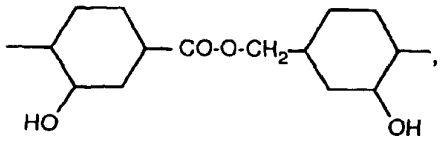


and if n is 3, R_7 is a group



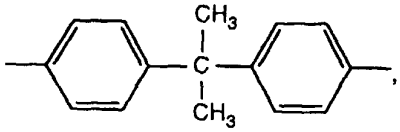
and if n is 4, R_7 is a group

R_8 is C_3-C_{20}alkyl which is interrupted by one or more O and can be substituted by OH or
R_8 is C_1-C_4alkyl which is substituted by -P(O)$(OR_{14})_2$ or R_8 is C_3-C_{18}alkenyl,
R_9 and R_{10} independently are C_1-C_8alkyl or cyclohexyl or R_9 and R_{10} together are pentamethylene or 3-oxapentamethylene,
R_{14} is C_1-C_{14}alkyl,
R_{15} is C_2-C_8alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, or R_{15} is a group -phenylene-X-phenylene- in which X is -O-, $-CH_2-$ or $-C(CH_3)_2-$,
R_{18} is C_4-C_8alkylene or C_4-C_{12}alkylene which is interrupted by one or more 0,
R_{21} is C_4-C_{18}alkyl, allyl, phenyl, furyl, C_5-C_{19}alkanoyl or C_3-C_5alkenoyl and R_{22} is C_2-C_5alkenyl, in particular those in which n is 1, 2 or 4, R_1 and R_2 independently of one another are H or CH_3, R_3 and R_4 independently of one another are H, CH_3 or Cl, R_5 and R_6 are hydrogen,
R_7, if n is 1, is C_1-C_4alkyl which is substituted by -$COOR_8$, -CON$(R_9)(R_{10})$ or -O-COR_{22}, or R_7 is glycidyl, 2-hydroxycyclohexyl or a group -$CH_2CH(OH)CH_2OR_{21}$,
and if n is 2, R_7 is C_6-C_{12}alkenylene, 2-butene-1,4-ylene, xylylene or C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH, or R_7 is a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CH_2-COO-R_{18}-$OOCCH_2$- or



and if n is 4, R_7 is a group

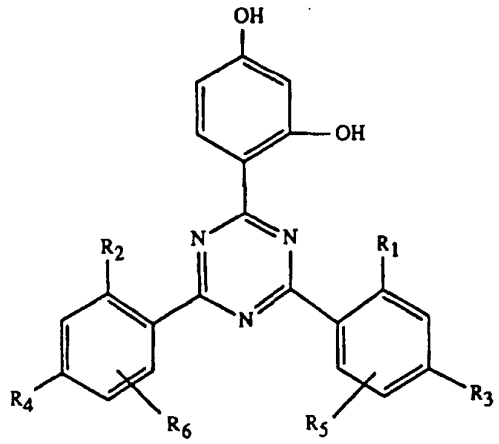
R_8 is C_3-C_{20}alkyl which is interrupted by one or more O and can be substituted by OH or R_8 is -$CH_2P(O)(OR_{14})_2$ or oleyl
R_9 and R_{10} are C_2-C_6alkyl
R_{15} is C_2-C_8alkylene, C_{10}-C_{45}alkylene which is interrupted by one or more 0 or is a group



R_{18} is C_4-C_8alkylene,
R_{21} is C_4-C_{15}alkyl, allyl, phenyl, furyl, C_5-C_{12}alkanoyl or C_3-C_5alkenoyl and R_{22} is C_2-C_3alkenyl.

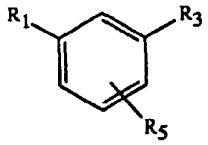
The compounds of the formula Ia in which n is 2 are also preferred.

In general, the compounds of the formula I and Ia can be prepared by introducing the radical R_7 into the p-hydroxyl group in a compound of the formula II

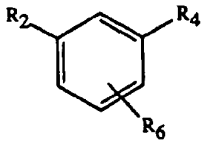


II.

The compounds of the formula II are known compounds and can be prepared by a Friedel-Crafts reaction between cyanuric chloride and 1 mole of an aromatic compound of the formula



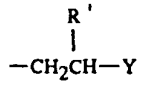
and 1 mole of an aromatic compound of the formula



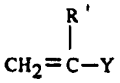
and 1 mole of resorcinol, as described, for example, in Swiss Patent 480,091 or in Swiss Patent 484,695 or in US Patent 3,244,708.

The conversion of II into I can be effected by various processes known per se, depending on the nature of the radical R_7. If R_7 is substituted alkyl, alkenyl, glycidyl, phenylalkyl, -CO-R_{12}, -SO_2-R_{13}, alkylene, alkenylene, xylylene or -$COR_{16}CO$-, the compound II or an alkali metal salt thereof can be reacted with a halogen compound of the formula Hal-R_7 or Hal-R_7-Hal in which Hal is chlorine, bromine or iodine, in particular with the compounds Cl-R_7 and Cl-R_7-Cl.

If R_7 is a group

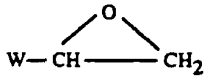


in which R'is hydrogen or CH_3 and Y is -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$ or -CN, the compounds can be prepared by reacting a compound of the formula II with a compound of the formula

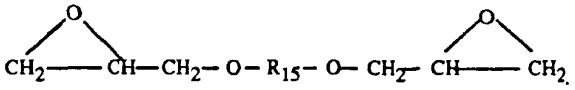


in the manner of a so-called Michael addition reaction.

If R_7 is a group $-CH_2CH(OH)-W$ in which W is alkyl, phenyl, phenylalkyl or $-CH_2OR_{21}$, such compounds can be prepared by reacting a compound of the formula II with an epoxide of the formula



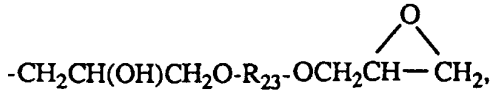
Analogously, compounds of the formula I in which n is 2 and R_7 is a group $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, can be prepared by reacting 2 moles of a compound II and 1 mole of a bis-glycidyl ether of the formula



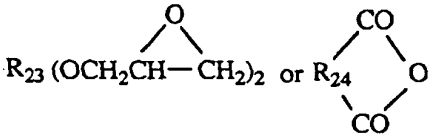
Compounds of the formula I in which R_7 is cyclohexyl substituted by OH can be prepared by reaction of II with cyclohexene oxide.

Compounds of the formula I in which n is 2 and R_7 is $-CO-NH-R_{17}-NH-CO-$ can be prepared by reacting 2 moles of a compound of the formula II with 1 mole of a diisocyanate $OCN-R_{17}-NCO$. Compounds of the formula I in which n is 2 and R_7 is a group $-CH_2CH(OH)CH_2-$ can be prepared by reacting 2 moles of a compound II with 1 mole of epichlorohydrin.

Compounds of formula I or Ia wherein n is 1 and R_7 is a group



or a group $-CO-R_{24}-COOH$ or $-CONH-R_{17}-NCO$ can be prepared from II by reaction with one molar equivalent of a compound



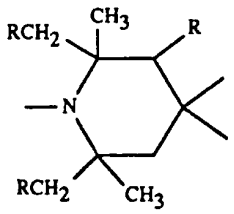
or $OCN-R_{17}-NCO$ respestively.

It is also possible to convert a compound of the formula I into another compound of the formula I. For example, a hydroxyalkyl or aminoalkyl radical R_7 can be converted by acylation with $R_{11}COCl$ into the corresponding acyloxy or acylamino derivative.

Or a cyanoalkyl radical R_7 can be converted by reduction into an aminoalkyl radical. Compounds in which R_7 is alkyl which is substituted by $-COOR_8$ can be transesterified with another alcohol or polyol.

The methods required for the individual stages of the synthesis are known to those skilled in the art; some of them are described in greater detail in the examples which follow later.

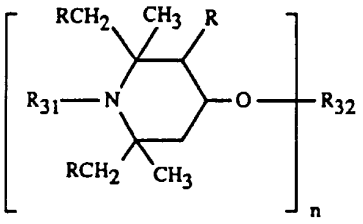
The polyalkylpiperidines used as the component (a) preferably contain at least one group of the formula



in which R is hydrogen or methyl. R is preferably hydrogen. These are derivatives of polyalkylpiperidines, in particular of 2,2,6,6-tetramethylpiperidine. These compounds preferably carry one or two polar substituents or a polar spiro ring system in the 4-position of the piperidine ring. These compounds can be low-molecular or oligomeric or polymeric compounds.

The following classes of polyalkylpiperidines are of particular importance.

a) Compounds of the formula III



III

in which n is a number from 1 to 4, R is hydrogen or methyl, R_{31} is hydrogen, amine oxide, hydroxyl, C_1-C_{12}alkyl, C_3-C_8alkenyl, C_3-C_8alkinyl, C_7-C_{12}aralkyl, C_1-C_{18}alkoxy, C_5-C_8cycloalkoxy, C_7-C_9phenylalkoxy, C_1-C_8alkanoyl, C_3-C_5alkenoyl, C_1-C_{18}alkanoyloxy, benzyloxy, glycidyl or a group $-CH_2CH(OH)-Z$, in which Z is hydrogen, methyl or phenyl, R_{31} being preferably H, C_1-C_4alkyl, allyl, benzyl, acetyl or acryloyl, and, if n is 1, R_{32} is hydrogen, C_1-C_{18}alkyl which can be interrupted by one or more oxygen atoms, cyanoethyl, benzyl, glycidyl, a monovalent radical of an aliphatic, cycloaliphatic, araliphatic, unsaturated or aromatic carboxylic acid, carbamic acid or an acid containing phosphorus or a monovalent silyl radical, preferably a radical of an aliphatic carboxylic acid having 2 to 18 C atoms, a cycloaliphatic carboxylic acid having 7 to 15 C atoms, an α,β-unsaturated carboxylic acid having 3 to 5 C atoms or an aromatic carboxylic acid having 7 to 15 C atoms, or, if n is 2, is C_1-C_{12}alkylene, C_4-C_{12}alkenylene, xylylene, a divalent radical of an aliphatic, cycloaliphatic, araliphatic or aromatic dicarboxylic acid, dicarbamic acid, or acid containing phosphorus, or a divalent silyl radical, preferably a radical of an aliphatic dicarboxylic acid having 2 to 36 C atoms, a cycloaliphatic or aromatic dicarboxylic acid having 8-14 C atoms or an aliphatic, cycloaliphatic or aromatic dicarbamic acid having 8-14 C atoms, or, if n is 3, is a trivalent radical of an aliphatic, cycloaliphatic or aromatic tricarboxylic acid, an aromatic tricarbamic acid or an acid containing phosphorus, or a trivalent silyl radical, and, if n is 4, is a tetravalent radical of an aliphatic, cycloaliphatic or aromatic tetracarboxylic acid.

Examples of possible C_1-C_{12}alkyl substituents are methyl, ethyl, n-propyl, n-butyl, sec-butyl, tert-butyl, n-hexyl, n-octyl, 2-ethylhexyl, n-nonyl, n-decyl, n-undecyl or n-dodecyl.

As C_1-C_{18}alkyl, R_{31} or R_{32} can be the groups defined above and additionally, for example, n-tridecyl, n-tetradecyl, n-hexadecyl or n-octadecyl.

As C_3-C_8alkenyl, R_{31} can, for example, be 1-propenyl, allyl, methallyl, 2-butenyl, 2-pentenyl, 2-hexenyl, 2-octenyl, 4-tert-butyl-2-butenyl.

As C_3-C_8alkinyl, R_{31} is preferably propargyl.

As C_7-C_{12}aralkyl, R_{31} is especially phenethyl and, in particular, benzyl.

Examples of R_{31} as C_1-C_8alkanoyl are formyl, propionyl, butyryl or octanoyl, but preferably acetyl, and examples of R_{21} as C_3-C_5alkenoyl are especially acryloyl.

Examples of R_{31} as C_1-C_{18}alkoxy are hexyloxy, heptyloxy, octyloxy or decyloxy. As cycloalkoxy, R_{31} is preferably cyclohexyloxy. As phenylalkoxy, R_{31} is preferably benzyloxy. Examples of R_{31} as alkanoyloxy are acetoxy, butyroyloxy, hexanoyloxy, octanoyloxy, decanoyloxy or stearoyloxy.

Examples of R_{32} as a monovalent radical of a carboxylic acid are a radical of acetic acid, caproic acid, stearic acid, acrylic acid, methacrylic acid, benzoic acid or β-(3,5-di-tert-butyl-4-hydroxyphenyl)-propionic acid.

Examples of R_{32} as a divalent radical of a dicarboxylic acid are a radical of malonic acid, succinic acid, glutaric acid, adipic acid, suberic acid, sebacic acid, maleic acid, itaconic acid, phthalic acid, dibutylmalonic acid, dibenzylmalonic acid, butyl-(3,5-di-tert-butyl-4-hydroxybenzyl)-malonic acid or bicycloheptenedicarboxylic acid.

Examples of R_{32} as a trivalent radical of a tricarboxylic acid are a radical of trimellitic acid, citric acid or nitrilotriacetic acid.

Examples of R_{32} as a tetravalent radical of a tetracarboxylic acid are the tetravalent radical of butane- 1,2,3,4-tetracarboxylic acid or pyromellitic acid.

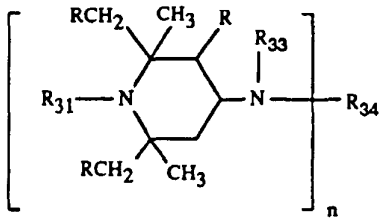
Examples of R_{32} as a divalent radical of a dicarbamic acid are a radical of hexamethylenedicarbamic acid or 2,4-toluylenedicarbamic acid.

Preferred compounds of the formula III are those in which R is hydrogen, R_{31} is hydrogen or methyl, n is 1 and R_{32} is C_1-C_{18}alkyl, or n is 2 and R_{32} is the diacyl radical of an aliphatic dicarboxylic acid having 4-12 C atoms.

The following compounds are examples of polyalkylpiperidine compounds of this class:

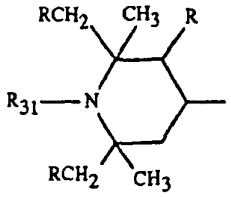
1) 4-Hydroxy-2,2,6,6-tetramethylpiperidine,
2) 1-Allyl-4-hydroxy-2,2,6,6-tetramethylpiperidine,
3) 1-Benzyl-4-hydroxy-2,2,6,6-tetramethylpiperidine,
4) 1-(4-tert-Butyl-2-butenyl)-4-hydroxy-2,2,6,6-tetramethylpiperidine,
5) 4-Stearoyloxy-2,2,6,6-tetramethylpiperidine,
6) 1-Ethyl-4-salicyloyloxy-2,2,6,6-tetramethylpiperidine,
7) 4-Methacryloyloxy-1,2,2,6,6-pentamethylpiperidine,
8) 1,2,2,6,6-Pentamethylpiperidin-4-yl β-(3,5-di-tert-butyl-4-hydroxyphenyl)-propionate,
9) Di-(1-benzyl-2,2,6,6-tetramethylpiperidin-4-yl) maleinate,
10) Di-(2,2,6,6-tetramethylpiperidin-4-yl) succinate,
11) Di-(2,2,6,6-tetramethylpiperidin-4-yl) glutarate,
12) Di-(2,2,6,6-tetramethylpiperidin-4-yl) adipate,
13) Di-(2,2,6,6-tematrethylpiperidin-4-yl) sebacate,
14) Di-(1,2,2,6,6-pentamethylpiperidin-4-yl) sebacate,
15) Di-(1,2,3,6-tetramethyl-2,6-diethyl-piperidin-4-yl) sebacate,
16) Di-(1-allyl-2,2,6,6-tetramethylpiperidin-4-yl) phthalate,
17) 1-Hydroxy-4-β-cyanoethyloxy-2,2,6,6-tetramethylpiperidine,
18) 1-Acetyl-2,2,6,6-tetramethylpiperidin-4-yl acetate,
19) Tri-(2,2,6,6-tetramethylpiperidin-4-yl) trimellitate,
20) 1-Acryloyl-4-benzyloxy-2,2,6,6-tetramethylpiperidine,
21) Di-(2,2,6,6-tetramethylpiperidin-4-yl) diethylmalonate,
22) Di-(1,2,2,6,6-pentamethylpiperidin-4-yl) dibutylmalonate,
23) Di-(1,2,2,6,6-pentamethylpiperidin-4-yl) butyl-(3,5-di-tert-butyl-4-hydroxybenzyl)-malonate,
24) Di-(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl) sebacate,
25) Di-(1-cyclohexyloxy-2,2,6,6-tetramethylpiperidin-4-yl)sebacate,
26) Hexane-1',6'-bis-(4-carbamoyloxy-1-n-butyl-2,2,6,6-tetramethylpiperidine),
27) Toluene-2',4'-bis-(4-carbamoyloxy-1-n-propyl-2,2,6,6-tetramethylpiperidine),
28) Tetra-(2,2,6,6-tetramethylpiperidin-4-yl) butane-1,2,3,4-tetracarboxylate,
29) Tetra-(1,2,2,6,6-pentamethylpiperidin-4-yl) butane-1,2,3,4-tetracarboxylate,
30) Tris-(1-propyl-2,2,6,6-tetramethylpiperidin-4-yl) phosphite,
31) Tris-(1-propyl-2,2,6,6-tetramethylpiperidin-4-yl) phosphate,
32) Phenyl-[bis-(1,2,2,6,6-pentamethylpiperidin-4-yl)] phosphonate,
33) 4-Hydroxy-1,2,2,6,6-pentamethylpiperidine,
34) 4-Hydroxy-N-hydroxyethyl-2,2,6,6-tetramethylpiperidine,
35) 4-Hydroxy-N-(2-hydroxypropyl-2,2,6,6-tetramethylpiperidine,
36) 1-Glycidyl-4-hydroxy-2,2,6,6-tetramethylpiperidine.

b) Compounds of the formula IV



IV

in which n is the number 1 or 2, R and R_{31} are as defined under a), R_{33} is hydrogen, C_1-C_{12}alkyl, C_2-C_5hydroxyalkyl, C_5-C_7cycloalkyl, C_7-C_8aralkyl, C_2-C_{18}alkanoyl, C_3-C_5alkenoyl, benzoyl or a group of the formula



and, if n is 1, R_{34} is hydrogen, C_1-C_{18}alkyl, C_3-C_8alkenyl, C_5-C_7cycloalkyl, C_1-C_4alkyl which is substituted by a hydroxyl, cyano, alkoxycarbonyl or carbamide group, glycidyl or a group of the formula -CH_2-CH(OH)-Z or of the formula -CONH-Z in which Z is hydrogen, methyl or phenyl or R_{34} is a group -CO-CO-NH-(C_1-C_{18}alkyl); or, if n is 2, R_{34} is C_2-C_{12}alkylene, C_6-C_{12}arylene, xylylene, a -CH_2-CH(OH)-CH_2- group or a group -CH_2-CH(OH)-CH_2-O-D-O- in which D is C_2-C_{10}alkylene, C_6-C_{15}arylene or C_6-C_{12}cycloalkylene or, provided that R_{33} is not alkanoyl, alkenoyl or benzoyl, R_{34} can also be a divalent radical of an aliphatic, cycloaliphatic or aromatic dicarboxylic acid or dicarbamic acid or the group -CO-, or, if n is 1, R_{33} and R_{34} together can be the divalent radical of an aliphatic, cycloaliphatic or aromatic 1,2-dicarboxylic or 1,3-dicarboxylic acid.

Possible C_1-C_{12}alkyl or C_1-C_{18}alkyl substituents are as already defined under a).

Possible C_5-C_7cycloalkyl substituents are especially cyclohexyl,

As C_7-C_8aralkyl, R_{33} is especially phenylethyl or, in particular, benzyl. As C_2-C_5hydroxyalkyl, R_{33} is especially 2-hydroxyethyl or 2-hydroxypropyl.

Examples of R_{33} as C_2-C_{18}alkanoyl are propionyl, butyryl, octanoyl, dodecanoyl, hexadecanoyl or octadecanoyl, but preferably acetyl, and examples of R_{33} as C_3-C_5alkenoyl are especially acryloyl.

Examples of R_{34} as C_2-C_8alkenyl are allyl, methallyl, 2-butenyl, 2-pentenyl, 2-hexenyl or 2-octenyl.

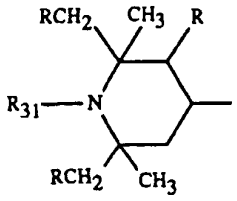
Examples of R_{34} as C_1-C_4alkyl which is substituted by a hydroxyl, cyano, alkoxycarbonyl or carbamide group are 2-hydroxyethyl, 2-hydroxypropyl, 2-cyanoethyl, methoxycarbonylmethyl, 2-ethoxycarbonylethyl, 2-aminocarbonylpropyl or 2-(dimethylaminocarbonyl)-ethyl.

Examples of possible C_2-C_{12}alkylene substituents are ethylene, propylene, 2,2-dimethyl-propylene, tetramethylene, hexamethylene, octamethylene, decamethylene or dodecamethylene.

Examples of possible C_6-C_{15}arylene substituents are o-, m- or p-phenylene, 1,4-naphthylene or 4,4'-biphenylene.

As C_6-C_{12}cycloalkylene, D is especially cyclohexylene.

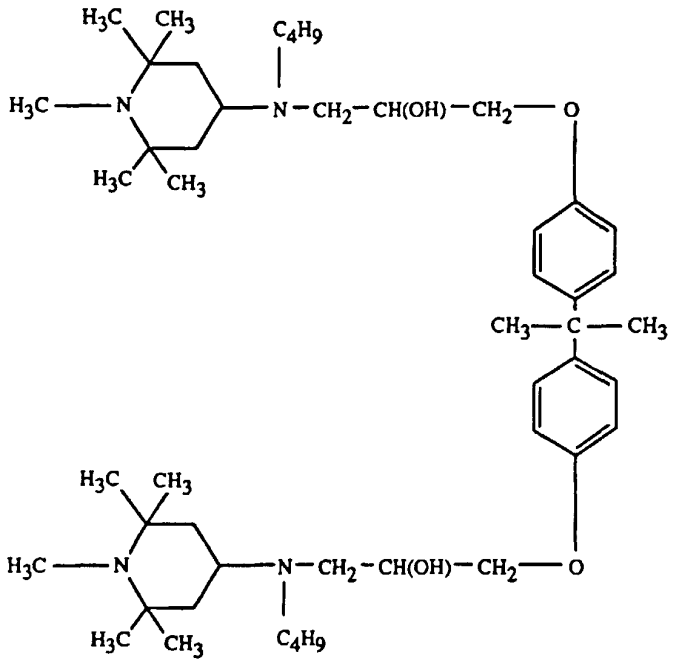
Preferred compounds of the formula IV are those in which n is 1 or 2, R is hydrogen, R_{31} is hydrogen or methyl, R_{33} is hydrogen, C_1-C_{12}alkyl or a group of the formula



and, in the event that n = 1, R_{34} is hydrogen or C_1-C_{12}alkyl and, in the event that n = 2, R_{34} is C_2-C_8alkylene.

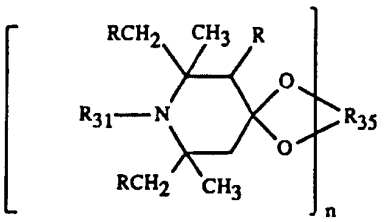
The following compounds are examples of polyalkylpiperidine compounds of this class:

37) N,N'-Bis-(2,2,6,6-tetramethylpiperidin-4-yl)-hexamethylene-1,6-diamine,
38) N,N'-Bis-(2,2,6,6-tetramethylpiperidin-4-yl)-hexamethylene-1,6-diacetamide,
39) Bis-(2,2,6,6-tetramethylpiperidin-4-yl)-amine,
40) 4-Benzoylamino-2,2,6,6-tetramethylpiperidine,
41) N,N'-Bis-(2,2,6,6-tetramethylpiperidin-4-yl)-N,N'-dibutyladipamide,
42) N,N'-Bis-(2,2,6,6-tetramethylpiperidin-4-yl)-N,N'-dicyclohexyl-2-hydroxypropylene-1,3-diamine,
43) N,N'-Bis-(2,2,6,6-tetramethylpiperidin-4-yl)-p-xylylenediamine,
44) N,N'-Bis-(2,2,6,6-tetramethylpiperidin-4-yl)-succindiamide,
45) N-(2,2,6,6-Tetramethylpiperidin-4-yl)-β-aminopropionic acid dodecyl ester,
46) The compound of the formula



47) N-(1-Octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)-N'-dodecyl-oxalamide
48) N-(2,2,6,6-Tetramethylpiperidin-4-yl)-α-dodecylsuccinimide,
49) 4-Methacrylamido-1,2,2,6,6-pentamethylpiperidine.

c) Compounds of the formula V,



V

in which n is the number 1 or 2, R and R_{31} are as defined under a) and, if n is 1, R_{35} is C_2-C_8alkylene or C_2-C_8hydroxyalkylene or C_4-C_{22}acyloxyalkylene and, if n is 2, R_{35} is the group $(-CH_2)_2C(CH_2-)_2$.

Examples of R_{35} as C_2-C_8alkylene or C_2-C_8hydroxyalkylene are ethylene, 1-methylethylene, propylene, 2-ethylpropylene or 2-ethyl-2-hydroxymethylpropylene.

An example of R_{35} as C_4-C_{22}acyloxyalkylene is 2-ethyl-2-acetoxymethylpropylene.

The following compounds are examples of polyalkylpiperidine compounds of this class:

50) 9-Aza-8,8,10,10-tetramethyl-1,5-dioxaspiro[5.5]undecane,

51) 9-Aza-8,8,10,10-tetramethyl-3-ethyl-1,5-dioxaspiro[5.5]undecane,

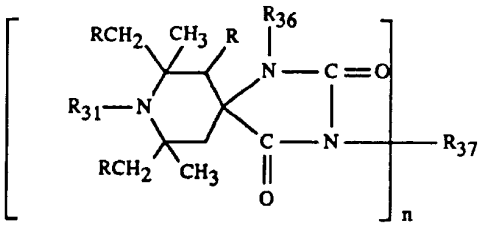
52) 8-Aza-2,7,7,8,9,9-hexamethyl-1,4-dioxaspiro[4.5]decane,

53) 9-Aza-3-hydroxymethyl-3-ethyl-8,8,9,10,10-pentamethyl-1,5-dioxaspiro[5.5]undecane,

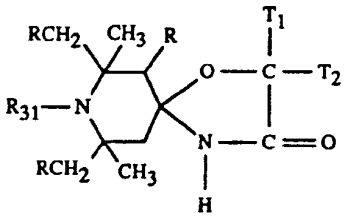
54) 9-Aza-3-ethyl-3-acetoxymethyl-9-acetyl-8,8,10,10-tetramethyl-1,5-dioxaspiro[5.5]undecane,

55) 2,2,6,6-Tetramethylpiperidin-4-spiro-2'-(1',3'-dioxane)-5'-spiro-5"-(1",3"-dioxane)-2"-spiro-4'''-(2''',2''',6''',6'''-tetramethylpiperidine).

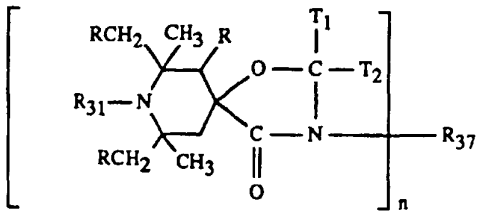
d) Compounds of the formulae VIA, VIB and VIC



VIA



VIB



VIC

in which n is the number 1 or 2, R and R_{31} are as defined under a), R_{36} is hydrogen, C_1-C_{12}alkyl, allyl, benzyl, glycidyl or C_2-C_6alkoxyalkyl and, if n is 1, R_{37} is hydrogen, C_1-C_{12}alkyl, C_3-C_5alkenyl, C_7-C_9aralkyl, C_5-C_7cycloalkyl, C_2-C_4hydroxyalkyl, C_2-C_6alkoxyalkyl, C_6-C_{10}aryl, glycidyl or a group of the formula $-(CH_2)_p$-COO-Q or the formula $-(CH_2)_p$-O-CO-Q in which p is 1 or 2 and Q is C_1-C_4alkyl or phenyl, or, if n is 2, R_{36} is C_2-C_{12}alkylene, C_4-C_{12}alkenylene, C_6-C_{12}arylene, a group $-CH_2$-CH(OH)-CH_2-O-D-O-CH_2-CH(OH)-CH_2- in which D is C_2-C_{10}alkylene, C_6-C_{15}arylene or C_6-C_{12}cycloalkylene, or a group $-CH_2CH(OZ')CH_2$-$(OCH_2$-$CH(OZ')CH_2)_2$- in which Z' is hydrogen, C_1-C_{18}alkyl, allyl, benzyl, C_2-C_{12}alkanoyl or benzoyl, T_1 and T_2 independently of one another are hydrogen, C_1-C_{18}alkyl or C_6-C_{10}aryl or C_7-C_9aralkyl each of which is unsubstituted or substituted by halogen or C_1-C_4alkyl, or T_1 and T_2, together with the C atom linking them, form a C_5-C_{12}cycloalkane ring.

Examples of possible C_1-C_{12}alkyl substituents are methyl, ethyl, n-propyl, n-butyl, sec-butyl, tert-butyl, n-hexyl, n-octyl, 2-ethylhexyl, n-nonyl, n-decyl, n-undecyl or n-dodecyl.

Examples of possible C_1-C_{18}alkyl substituents can be the groups defined above and also, for example, n-tridecyl, n-tetradecyl, n-hexadecyl or n-octadecyl.

Examples of possible C_2-C_6alkoxyalkyl substituents are methoxymethyl, ethoxymethyl, propoxymethyl, tert-butoxymethyl, ethoxyethyl, ethoxypropyl, n-butoxyethyl, tert-butoxyethyl, isopropoxyethyl or propoxypropyl.

Examples of R_{37} as C_3-C_5alkenyl are 1-propenyl, allyl, methallyl, 2-butenyl or 2-pentenyl.

As C_7-C_9aralkyl, R_{37}, T_1 and T_2 are especially phenethyl or, in particular, benzyl. If T_1 abd T_2, together with the C atom, form a cycloalkane ring, this can, for example, be a cyclopentane, cyclohexane, cyclooctane or cyclododecane ring

Examples of R_{37} as C_2-C_4hydroxyalkyl are 2-hydroxyethyl, 2-hydroxypropyl, 2-hydroxybutyl or 4-hydroxybutyl.

As C_6-C_{10}aryl, R_{37}, T_1 and T_2 are especially phenyl, α-naphthyl or β-naphthyl each of which is unsubstituted or substituted by halogen or C_1-C_4alkyl.

Examples of R_{37} as C_2-C_{12}alkylene are ethylene, propylene, 2,2-dimethylpropylene, tetramethylene, hexamethylene, octamethylene, decamethylene or dodecamethylene.

As C_4-C_{12}alkenylene, R_{37} is especially 2-butenylene, 2-pentenylene or 3-hexenylene.

Examples of R_{37} as C_6-C_{12}arylene are o-, m- or p-phenylene, 1,4-naphthylene or 4,4'-biphenylene.

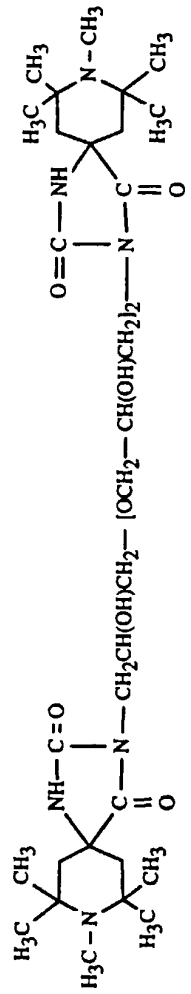
Examples of Z' as C_2-C_{12}alkanoyl are propionyl, butyryl, octanoyl or dodecanoyl, but preferably acetyl.

As C_2-C_{10}alkylene, C_6-C_{15}arylene or C_6-C_{12}cycloalkylene, D is as defined under b).

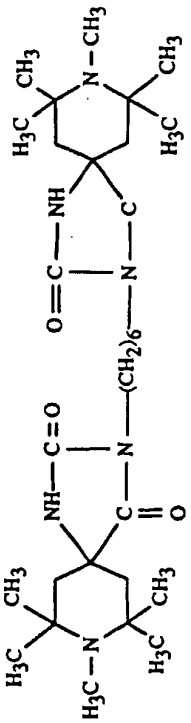
The following compounds are examples of polyalkylpiperidine compounds of this class:

56) 3-Benzyl-1,3,8-triaza-7,7,9,9-tetramethylspiro[4.5]decane-2,4-dione,
57) 3-n-Octyl-1,3,8-triaza-7,7,9,9-tetramethylspiro[4.5]decane-2,4-dione,
58) 3-Allyl-1,3,8-triaza-1,7,7,9,9-pentamethylspiro[4.5]decane-2,4-dione,
59) 3-Glycidyl-1,3,8-triaza-7,7,8,9,9-pentamethylspiro[4.5]decane-2,4-dione,
60) 1,3,7,7,8,9,9-Heptamethyl-1,3,8-triazaspiro[4.5]decane-2,4-dione,
61) 2-Isopropyl-7,7,9,9-tetramethyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane,
62) 2,2-Dibutyl-7,7,9,9-tetramethyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane,
63) 2,2,4,4-Tetramethyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]heneicosane,
64) 2-Butyl-7,7,9,9-tetramethyl-1-oxa-4,8-diaza-3-oxospiro[4.5]decane,
65) 8-Acetyl-3-dodecyl-1,3,8-triaza-7,7,9,9-tetramethylspiro[4.5]decane-2,4-dione

or the compounds of the following formulae:



66)



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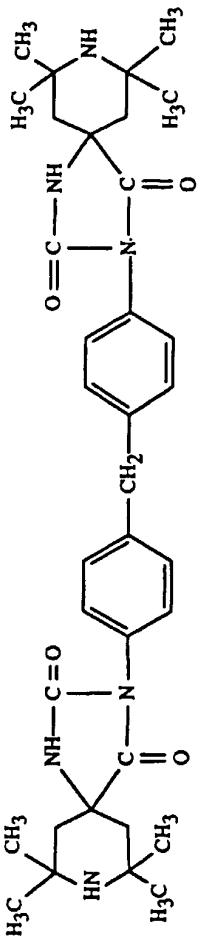
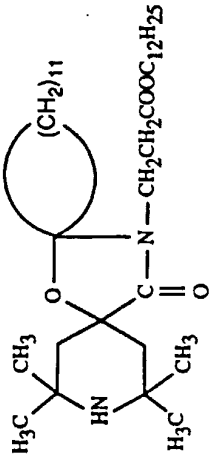
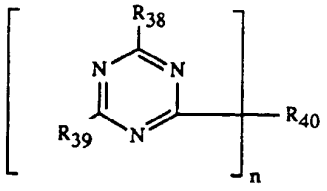


68)



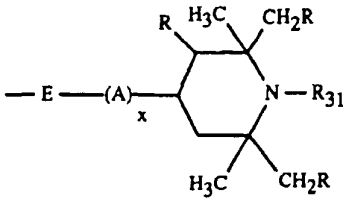
69)

e) Compounds of the formula VII,

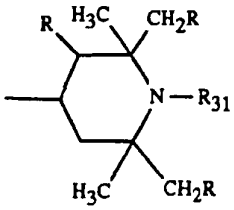


VII

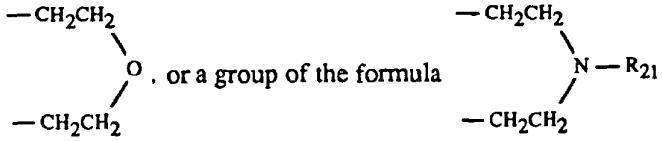
in which n is the number 1 or 2 and R_{33} is a group of the formula



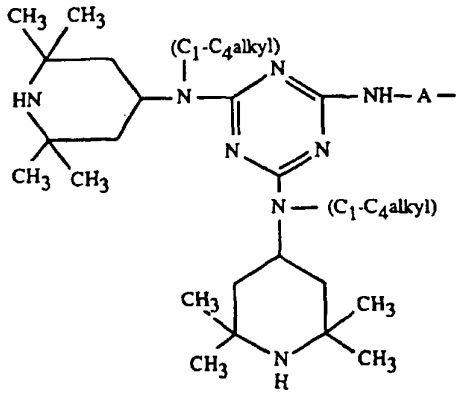
in which R and R_{31} are as defined under a), E is -O- or -NR_{41}-, A is C_2-C_6alkylene or -$(CH_2)_3$-O- and x is the numbers 0 or 1, R_{39} is identical with R_{38} or is one of the groups -$NR_{41}R_{42}$, -OR_{43}, -$NHCH_2OR_{43}$ or -$N(CH_2OR_{43})_2$, R_{40} is identical with R_{38} or R_{39}, if n is 1, and, if n is 2, is a group -E-B-E- in which B is C_2-C_6alkylene which can be interrupted by -N(R_{41})-, R_{41} is C_1-C_{12}alkyl, cyclohexyl, benzyl or C_1-C_4hydroxyalkyl or a group of the formula



R_{42} is C_1-C_{12}alkyl, cyclohexyl, benzyl or C_1-C_4hydroxyalkyl and R_{43} is hydrogen, C_1-C_{12}alkyl or phenyl or R_{41} and R_{42} together are C_4-C_5alkylene or C_4-C_5oxaalkylene, for example



or R_{41} and R_{42} are each a group of the formula



Examples of possible C_1-C_{12}alkyl substituents are methyl, ethyl, n-propyl, n-butyl, sec-butyl, tert-butyl, n-hexyl, n-octyl, 2-ethylhexyl, n-nonyl, n-decyl, n-undecyl or n-dodecyl.

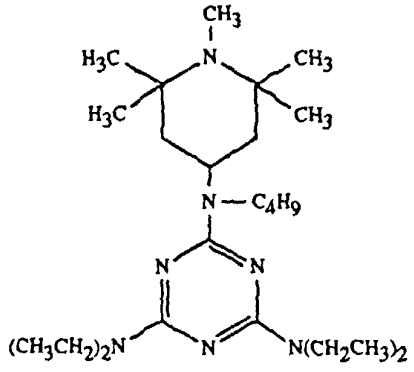
Examples of possible C_1-C_4hydroxyalkyl substituents are 2-hydroxyethyl, 2-hydroxypropyl, 3-hydroxypropyl, 2-hydroxybutyl or 4-hydroxybutyl.

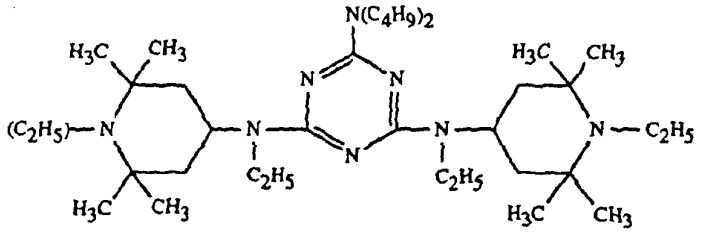
Examples of A as C_2-C_6alkylene are ethylene, propylene, 2,2-dimethylpropylene, tetramethylene or hexamethylene.

Examples of R_{41} and R_{42} together as C_4-C_5alkylene or oxaalkylene are tetramethylene, pentamethylene or 3-oxapentamethylene.

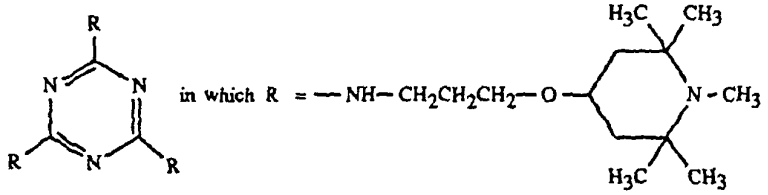
The compounds of the following formulae are examples of polyalkylpiperidine compounds of this class:

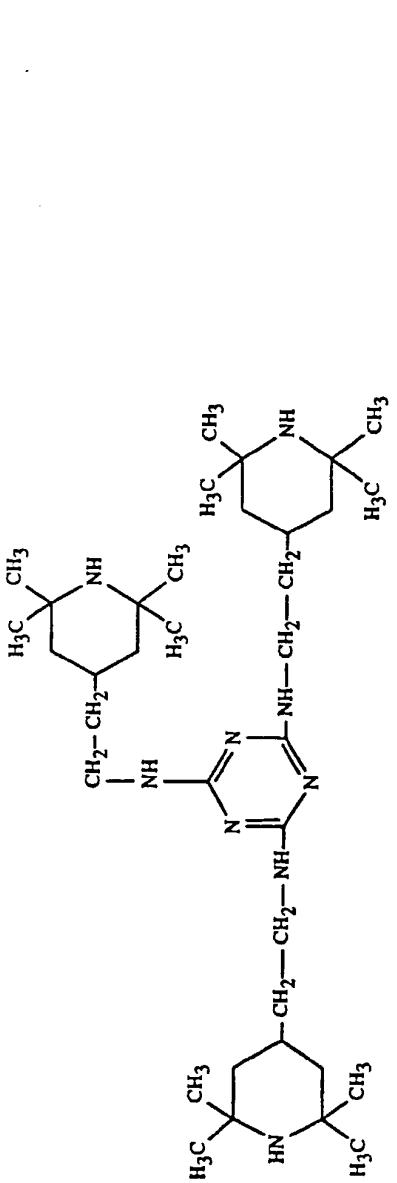
70)



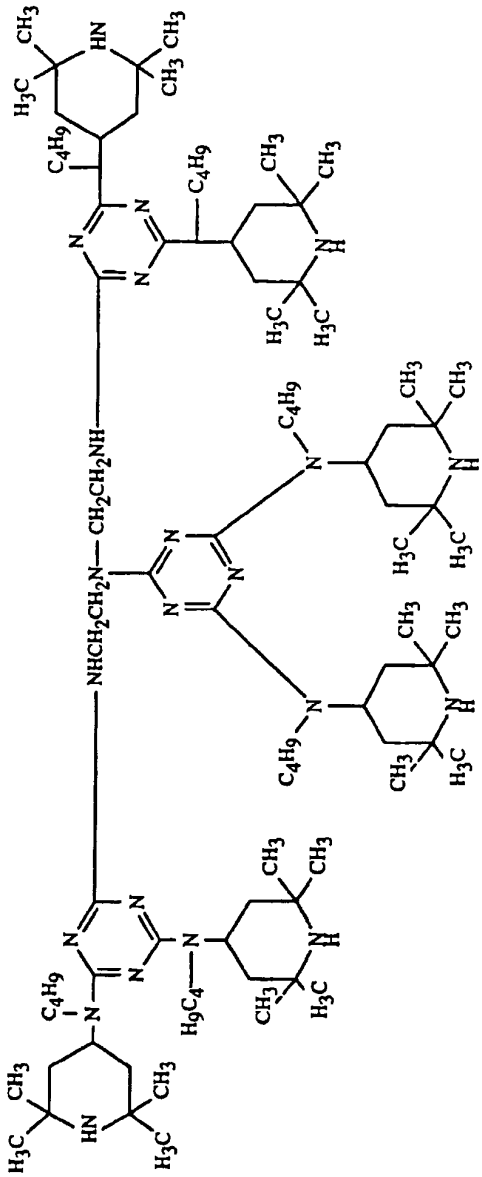


72)

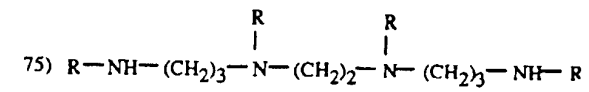




73)

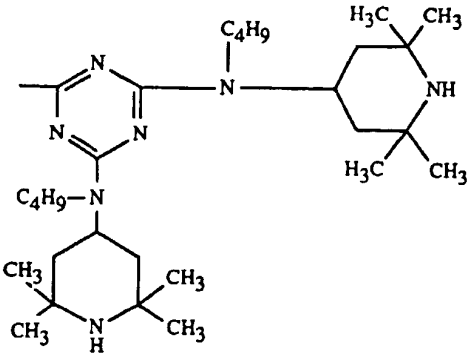


74)



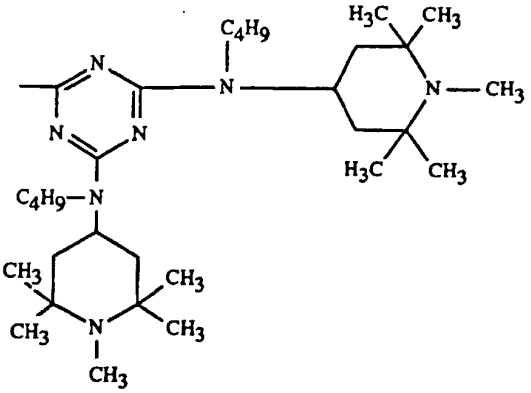
75)

in which R =



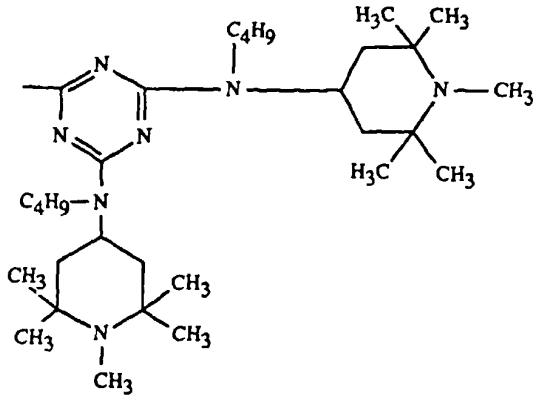
76) R—NH—$(CH_2)_3$—N(R)—$(CH_2)_2$—N(R)—$(CH_2)_3$—NH—R

in which R =



77) R—N(CH_3)—$(CH_2)_3$—N(R)—$(CH_2)_2$—N(R)—$(CH_2)_3$—N(CH_3)—R

in which R =



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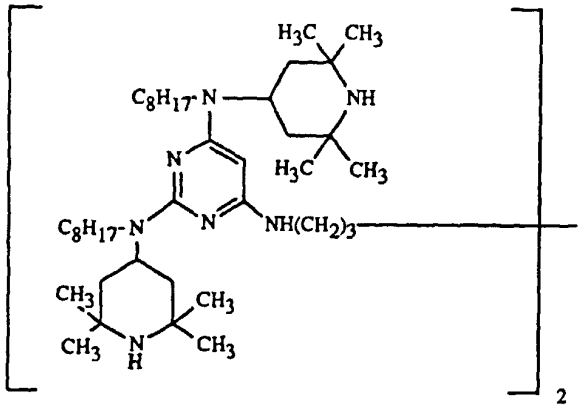
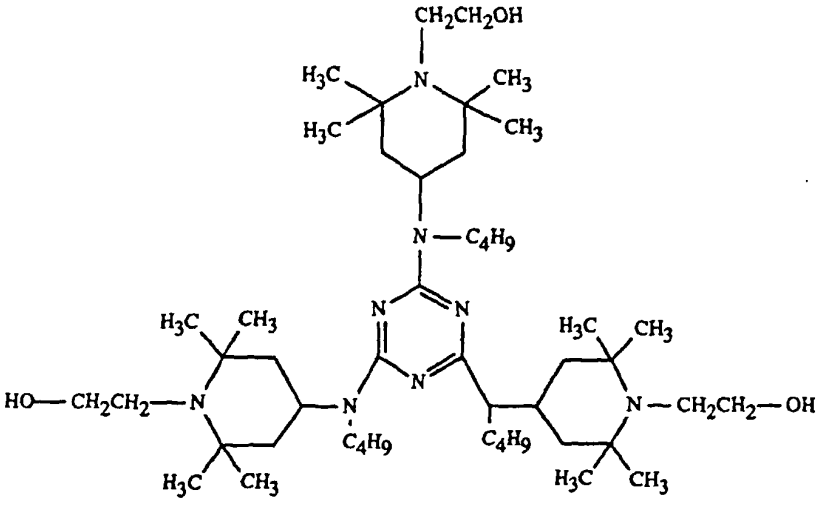
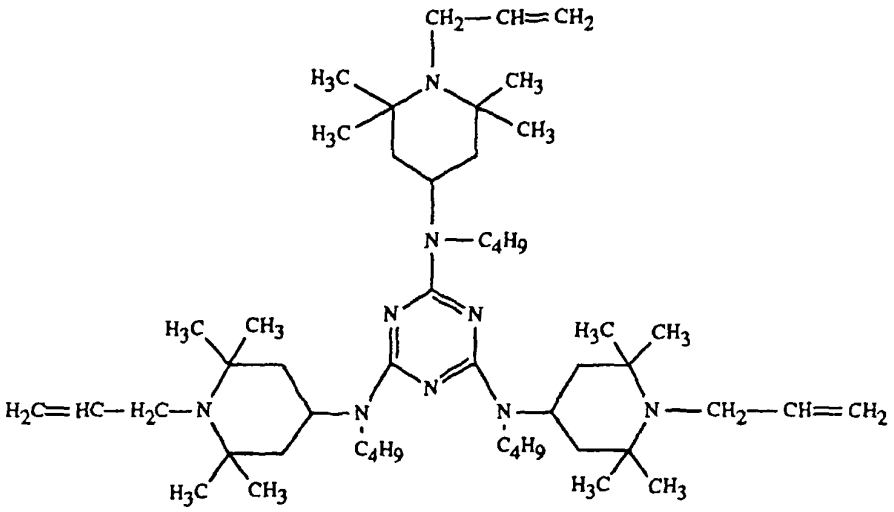


79)



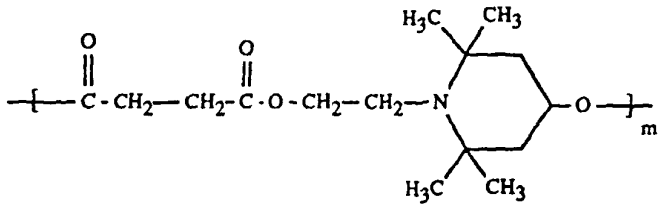
80)



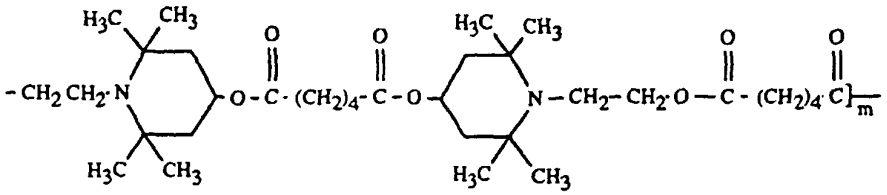
f) Oligomeric or polymeric compounds in which the recurring structural unit contains a 2,2,6,6-tetraalkylpiperidine radical of the formula (I), in particular polyesters, polyethers, polyamides, polyamines, polyurethanes, polyureas, polyaminotriazines, poly(meth)acrylates, poly(meth)acrylamides and copolymers thereof containing radicals of this type.

The compounds of the following formulae in which m is a number from 2 to about 200 are examples of 2,2,6,6-polyalkylpiperidine light stabilizers of this class.

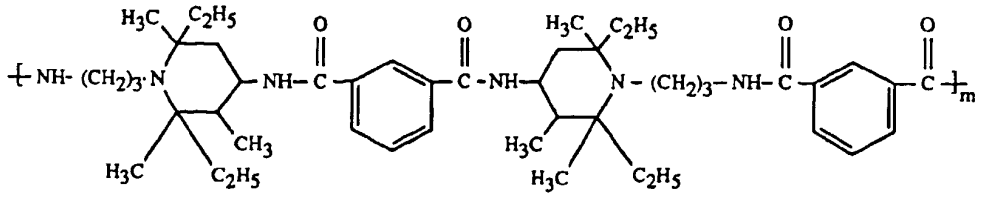
81)



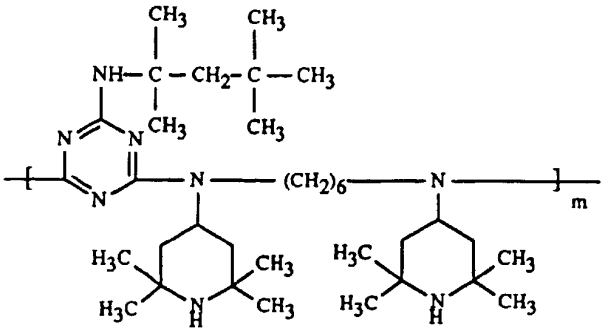
82)



83)



84)



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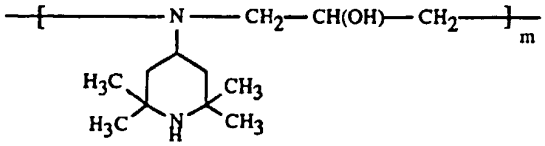

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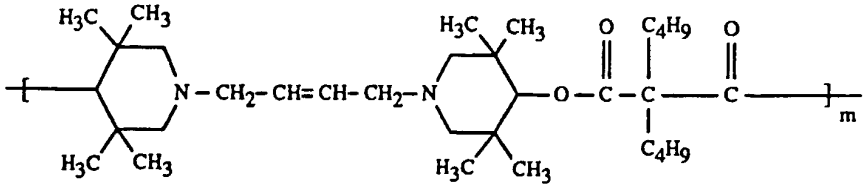

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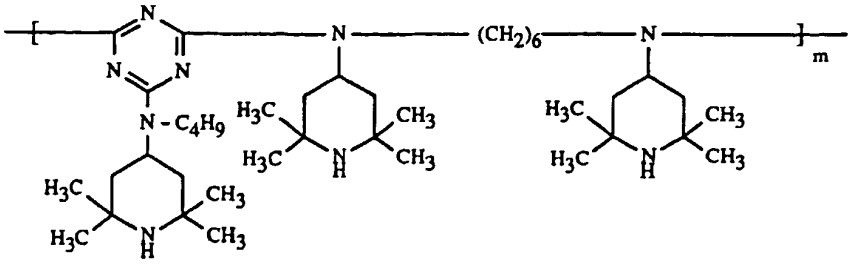

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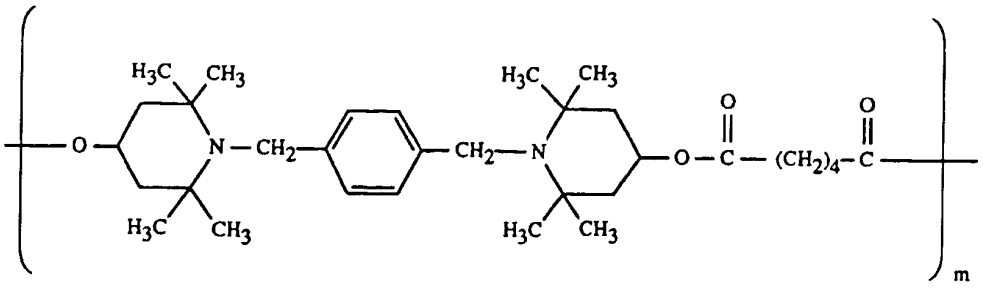

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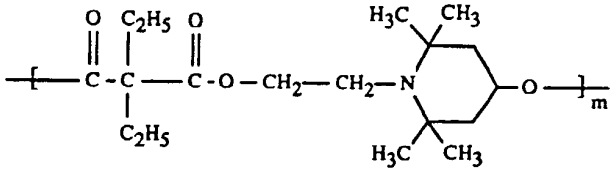

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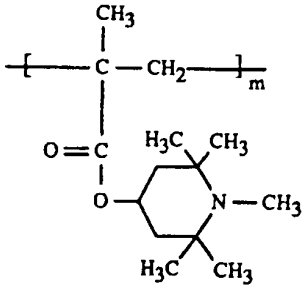

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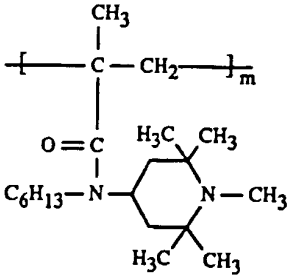

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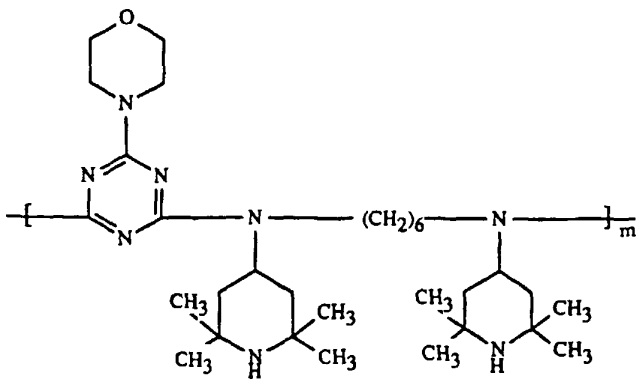

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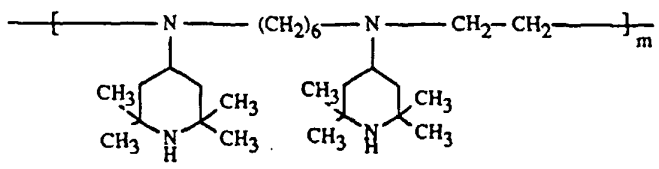

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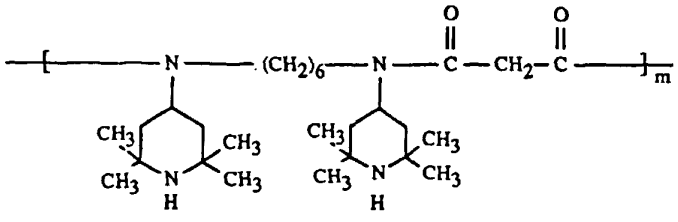


Of these classes of compounds, classes a), d), e) and f) are particularly suitable, in particular the Compounds Nos. 10, 13, 14, 23, 24, 28, 29, 45, 47, 48, 63, 65, 69, 75, 77, 81, 84, 92 and 93.

Examples of organic materials which can be stabilized with the mixture of (a) and (b) or with a compound of the formula Ia are fats, waxes, oils, cosmetics or photographic materials, but particularly organic polymers. The following classes are examples of polymers of this type:

1. Polymers of monoolefins and diolefins, for example polypropylene, polyisobutylene, polybut-1-ene, polymethylpent-1-ene, polyisoprene or polybutadiene, and polymerizates of cycloolefins, for example cyclopentene or norbornene; and also polyethylene (which can, if desired, be crosslinked), for example high-density polyethylene (HDPE), low-density polyethylene (LDPE) and linear low-density polyethylene (LLDPE).

2. Mixtures of the polymers mentioned under 1), for example mixtures of polypropylene with polyisobutylene or of polypropylene with polyethylene (for example PP/HDPE or PP/LDPE) and mixtures of different types of polyethylene (for example LDPE/HDPE).

3. Copolymers of monoolefins and diolefins with one another or with other vinyl monomers, for example ethylene/propylene copolymers, linear low-density polyethylene (LLDPE) and mixtures thereof with low-density polyethylene (LDPE), propylene/but-1-ene copolymers, propylene/isobutylene copolymers, ethylene/but-1-ene copolymers, ethylene/hexene copolymers, ethylene/methylpentene copolymers, ethylene/heptene copolymers, ethylene/octene copolymers, propylene/butadiene copolymers, isobutylene/isoprene copolymers, ethylene/alkyl acrylate copolymers, ethylene/alkyl methacrylate copolymers, ethylene/vinyl acetate copolymers or ethylene/acrylic acid copolymers and salts thereof (ionomers), and also terpolymers of ethylene with propylene and a diene, such as

hexadiene, dicyclopentadiene or ethylidenenorbornene; and also mixtures of such copolymers with one another and with polymers mentioned under 1), for example polypropylene/ethylene/propylene copolymers, LDPE-ethylene/vinyl acetate copolymers, LDPE-ethylene/acrylic acid copolymers, LLDPE-ethylene/vinyl acetate copolymers and LLDPE-ethylene/acrylic acid copolymers.

3a. Hydrocarbon resins (for example C_5-C_9), including hydrogenated modifications thereof (for example tackifying resins).

4. Polystyrene, poly-(p-methylstyrene) and poly-(α-methylstyrene).

5. Copolymers of styrene or α-methylstyrene with dienes or acrylic derivatives, for example styrene/butadiene, styrene/acrylonitrile, styrene/alkyl methacrylate, styrene/butadiene/alkyl acrylate, styrene/maleic anhydride or styrene/acrylonitrile/methyl acrylate; mixtures of high impact resistance formed from styrene copolymers and another polymer, for example a polyacrylate, a diene polymer or an ethylene/propylene/diene terpolymer; and block copolymers of styrene, for example styrene/butadiene/styrene, styrene/isoprene/styrene, styrene/ethylene-butylene/styrene or styrene/ethylene-propylene/styrene.

6. Graft copolymers of styrene or α-methylstyrene, for example styrene on polybutadiene, styrene on polybutadiene/styrene or polybutadiene/acrylonitrile copolymers, styrene and acrylonitrile (or methacrylonitrile) on polybutadiene; styrene, acrylonitrile and methyl methacrylate on polybutadiene; styrene and maleic anhydride on polybutadiene; styrene, acrylonitrile and maleic anhydride or maleimide on polybutadiene, styrene and maleimide on polybutadiene, styrene and alkyl acrylates or alkyl methacrylates on polybutadiene, styrene and acrylonitrile on ethylene/propylene/diene terpolymers, styrene and acrylonitrile on polyalkyl acrylates or polyalkyl methacrylates, styrene and acrylonitrile on acrylate/butadiene copolymers and mixtures thereof with the copolymers mentioned under 5), such as are known, for example, as so-called ABS, MBS, ASA or AES polymers.

7. Halogen-containing polymers, for example polychloroprene, chlorinated rubber, chlorinated or chlorosulfonated polyethylene, copolymers of ethylene and chlorinated ethylene, epichlorohydrin homopolymers and copolymers, in particular polymers formed from halogen-containing vinyl compounds, for example polyvinyl chloride, polyvinylidene chloride, polyvinyl fluoride or polyvinylidene fluoride; and copolymers thereof, such as vinyl chloride/vinylidene chloride, vinyl chloride/vinyl acetate or vinylidene chloride/vinyl acetate.

8. Polymers derived from α,β-unsaturated acids and derivatives thereof, such as polyacrylates and polymethacrylates, polyacrylamides and polyacrylonitriles.

9. Copolymers of the monomers mentioned under 8) with one another or with other unsaturated monomers, for example acrylonitrile/butadiene copolymers, acrylonitrile/alkyl acrylate copolymers, acrylonitrile/alkoxyalkyl acrylate copolymers, acrylonitrile/vinyl halide copolymers or acrylonitrile/alkyl methacrylate/butadiene terpolymers.

10. Polymers derived from unsaturated alcohols and amines or acyl derivatives or acetals thereof, such as polyvinyl alcohol, polyvinyl acetate, stearate, benzoate or maleate, polyvinylbutyral, polyallyl phthalate or polyallylmelamine; and copolymers thereof with olefins mentioned in item 1.

11. Homopolymers and copolymers of cyclic ethers, such as polyalkylene glycols, polyethylene oxide, polypropylene oxide or copolymers thereof with bisglycidyl ethers.

12. Polyacetals, such as polyoxymethylene, and also polyoxymethylenes of this type containing comonomers, for example ethylene oxide, and polyacetals modified with thermoplastic polyurethanes, acrylates or MBS.

13. Polyphenylene oxides and sulfides and mixtures thereof with styrene polymers or polyamides.

14. Polyurethanes derived from polyethers, polyesters and polybutadienes having terminal hydroxyl groups on the one hand and from aliphatic or aromatic polyisocyanates on the other hand, and also precursors thereof.

15. Polyamides and copolyamides derived from diamines and dicarboxylic acids and/or from aminocarboxylic acids or the corresponding lactams, such as polyamide 4, polyamide 6, polyamide 6/6, 6/10, 6/9, 6/12 or 4/6, polyamide 11, polyamide 12 and aromatic polyamides formed from m-xylene, diamine and adipic acid; and polyamides prepared from hexamethylenediamine and isophthalic and/or terephthalic acid and, if appropriate, an elastomer as

modifier, for example
poly-2,4,4-trimethylhexamethyleneterephthalamide or poly-m-phenyleneisophthalamide. Block copolymers of the polyamides mentioned above with polyolefins, olefin copolymers, ionomers or chemically attached or grafted elastomers; or with polyethers, for example polyethylene glycol, polypropylene glycol or polytetramethylene glycol. Also polyamides or copolyamides modified with EPDM or ABS; and polyamides which have been condensed during processing ("RIM polyamide systems").

16. Polyureas, polyimides, polyamide-imides and polybenzimidazoles.

17. Polyesters derived from dicarboxylic acids and dialcohols and/or from hydroxycarboxylic acids or the corresponding lactones, such as polyethylene terephthalate, polybutylene terephthalate, poly-1,4-dimethylolcyclohexane terephthalate, polyhydroxybenzoates and block polyether esters derived from polyethers having hydroxyl end groups; and also polyesters modified with polycarbonates or MBS.

18. Polycarbonates and polyester carbonates.

19. Polysulfones, polyether sulfones and polyether ketones.

20. Crosslinked polymers derived from aldehydes on the one hand and phenols, urea or melamine on the other hand, such as phenol/formaldehyde, urea/formaldehyde and melamine/formaldehyde resins.

21. Drying and non-drying alkyd resins.

22. Unsaturated polyester resins derived from copolyesters of saturated and unsaturated dicarboxylic acids with polyhydric alcohols, and also vinyl compounds as crosslinking agents, and also halogen-containing modifications thereof of low flammability.

23. Crosslinkable acrylic resins derived from substituted acrylic acid esters, for example from epoxyacrylates, urethane acrylates or polyester acrylates.

24. Alkyd resins, polyester resins and acrylate resins crosslinked with melamine resins, urea resins, polyisocyanates or epoxy resins.

25. Crosslinked epoxy resins derived from polyepoxides, for example from bis-glycidyl ethers or cycloaliphatic diepoxides.

26. Natural polymers, such as cellulose, natural rubber, gelatine and the polymer-homologously chemically modified derivatives thereof, such as cellulose acetates, propionates and butyrates or the cellulose ethers, such as methylcellulose; and also colophony resins and derivatives.

The use of the compounds according to the invention in coatings of all types is particularly preferred. These can be pigmented or unpigmented coatings or metal effect coatings. They can contain an organic solvent or can be solvent-free or can be aqueous coatings.

The coatings can contain, as a binder, at least one of the polymers listed above. The following are examples of coatings containing special binders:

1. Coatings based on cold-crosslinkable or hot-crosslinkable alkyd, acrylate, polyester, epoxy or melamine resins or mixtures of such resins, if desired with an added acid curing catalyst;

2. Two-component polyurethane coatings based on acrylate, polyester or polyether resins containing hydroxyl groups, and on aliphatic or aromatic polyisocyanates;

3. One-component polyurethane coatings based on masked polyisocyanates which are unmasked during baking;

4. Two-component coatings based on (poly)ketimines and aliphatic or aromatic polyisocyanates;

5. Two-component coatings based on (poly)ketimines and an unsaturated acrylate resin or a polyacetoacetate resin or a methyl methacrylamidoglycolate;

6. Two-component coatings based on polyacrylates and polyepoxides containing carboxyl or amino groups;

7. Two-component coatings based on acrylate resins containing anhydride groups, and on a polyhydroxyl or polyamino component;

8. Two-component coatings based on (poly)oxazolidines and acrylate resins containing anhydride groups, or unsaturated acrylate resins or aliphatic or aromatic polyisocyanates;

9. Two-component coatings based on unsaturated polyacrylates and polymalonates;

10. Thermoplastic polyacrylate coatings based on thermoplastic acrylate resins or extraneously crosslinking acrylate resins in combination with etherified melamine resins;

11. Coating systems based on siloxane-modified or silane-modified or fluorine-modified acrylate resins.

The coatings can also be radiation-curable. In this case the binder is composed of monomeric or oligomeric compounds which contain ethylenic double bonds and are converted into a crosslinked, high-molecular form by irradiation with actinic light or with electron beams. In most cases the binder is a mixture of such compounds. In radiation-curable coatings the compounds of formula I can be used also in absence of a sterically hindered amine.

The coatings can be applied as one-coat or two-coat systems, it being preferable to add the stabilizers according to the invention to the unpigmented top coat.

The coatings can be applied to the substrates (metal, plastic, wood, etc.) by the customary processes, for example by brushing, spraying, curtain-coating, dipping or electrophoresis.

The amount of (a) and (b) added depends on the substrate and the requirements for its stability. In general, 0.01 to 5% by weight, in particular 0.02 to 2% by weight, of the component (a) and 0.02 to 5% by weight, in particular 0.05 to 3% by weight, of the component (b) are added, relative to the polymer.

The two components can be added on their own or as a mixture. Addition is preferably carried out before or during the shaping of the polymer. It can also be carried out as early as the preparation of the polymer, for example before or during polymerization.

The compounds of the formula Ia can also be used on their own, ie. without a sterically hindered amine, for stabilizing organic polymers. In this case 0.01 to 10% by weight, for example, preferably 0.05 to 5% by weight, of a compound of the formula Ia is added to the polymer. The use of compounds of the formula Ia as a stabilizer for polycarbonates is of particular interest.

In addition to the stabilizers, according to the invention, of the formula Ia or the stabilizer combination (a) + (b), it is also possible to add other stabilizers to the polymer. The following are examples of these:

1. Antioxidants

1.1. Alkylated monophenols, for example 2,6-di-tert-butyl-4-methylphenol, 2-tert-butyl-4,6-dimethylphenol, 2,6-di-tert-butyl-4-ethylphenol, 2,6-di-tert-butyl-4-n-butylphenol, 2,6-di-tert-butyl-4-isobutylphenol, 2,6-di-cyclopentyl-4-methylphenol, 2-(α-methylcyclohexyl)-4,6-dimethylphenol, 2,6-dioctadecyl-4-methylphenol, 2,4,6-tricyclohexylphenol, 2,6-di-tert-butyl-4-methoxymethylphenol and 2,6-di-nonyl-4-methylphenol.

1.2. Alkylated hydroquinones, for example 2,6-di-tert-butyl-4-methoxyphenol, 2,5-di-tert-butylhydroquinone, 2,5-di-tert-amylhydroquinone and 2,6-diphenyl-4-octadecyloxyphenol.

1.3. Hydroxylated thiodiphenyl ethers, for example 2,2'-thiobis-(6-tert-butyl-4-methylphenol), 2,2'-thiobis-(4-octylphenol), 4,4'-thiobis-(6-tert-butyl-3-methylphenol), 4,4'-thiobis-(6-tert-butyl-2-methylphenol).

1.4. Alkylidene bisphenols, for example 2,2'-methylenebis-(6-tert-butyl-4-methylphenol), 2,2'-methylenebis-(6-tert-butyl-4-ethylphenol), 2,2'-methylenebis-[4-methyl-6(α-methylcyclohexyl)-phenol], 2,2'-methylenebis-(4-methyl-6-cyclohexylphenol), 2,2'-methylenebis-(6-nonyl-4-methylphenol), 2,2'-methylenebis-(4,6-di-tert-butylphenol), 2,2'-ethylidenebis-(4,6-di-tert-butylphenol), 2,2'-ethylidenebis-(6-tert-butyl-4-isobutylphenol), 2,2'-methylenebis-[6-(α-methylbenzyl)-4-nonylphenol], 2,2'-methylenebis-[6-(α,α-dimethylbenzyl)-4-nonylphenol], 4,4'-methylenebis-(2,6-di-tert-butylphenol), 4,4'-methylenebis-(6-tert-butyl-2-methylphenol), 1,1-bis-(5-tert-butyl-4-hydroxy-2-methylphenyl)-butane, 2,6-bis-(3-tert-butyl-5-methyl-2-hydroxybenzyl)-4-methylphenol, 1,1,3-tris-(5-tert-butyl-4-hydroxy-2-methylphenyl)butane, 1,1-bis-(5-tert-butyl-4-hydroxy-2-methylphenyl)-3-n-dodecylmercaptobutane, ethylene glycol bis-[3,3-bis-(3'-tert-butyl-4'-hydroxyphenyl)-butyrate], bis-(3-tert-butyl-4-hydroxy-5-methylphenyl)-

dicyclopentadiene and bis-[2-(3'-tert-butyl-2'-hydroxy-5'-methylbenzyl)-6-tert-butyl-4-methylphenyl] terephthalate.

1.5. Benzyl compounds, for example 1,3,5-tris-(3,5-di-tert-butyl-4-hydroxybenzyl)-2,4,6-trimethylbenzene, bis-(3,5-di-tert-butyl-4-hydroxybenzyl) sulfide, isooctyl 3,5-di-tert-butyl-4-hydroxybenzylmercaptoacetate, bis-(4-tert-butyl-3-hydroxy-2,6-dimethylbenzyl)-dithiol terephthalate, 1,3,5-tris-(3,5-di-tert-butyl-4-hydroxybenzyl) isocyanurate, 1,3,5-tris-(4-tert-butyl-3-hydroxy-2,6-dimethylbenzyl) isocyanurate, dioctadecyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate, the Ca salt of monoethyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate and 1,3,5-tris-(3,5-dicyclohexyl-4-hydroxybenzyl) isocyanurate.

1.6. Acylaminophenols, for example 4-hydroxylauranilide, 4-hydroxystearanilide, 2,4-bis-(octylmercapto)-6-(3,5-di-tert-butyl-4-hydroxyanilino)-s-triazine and octyl N-(3,5-di-tert-butyl-4-hydroxyphenyl)-carbamate.

1.7. Esters of β-(3,5-di-tert-butyl-4-hydroxyphenyl)-propionic acid, with monohydric or polyhydric alcohols, for example methanol, octadecanol, 1,6-hexanediol, neopentyl glycol, thiodiethylene glycol, diethylene glycol, triethylene glycol, pentaerythritol, tris-(hydroxyethyl) isocyanurate and N,N'-bis-(hydroxyethyl)oxamide.

1.8. Esters of β-(5-tert-butyl-4-hydroxy-3-methylphenyl)-propionic acid with monohydric or polyhydric alcohols, for example methanol, octadecanol, 1,6-hexanediol, neopentyl glycol, thiodiethylene glycol, diethylene glycol, triethylene glycol, pentaerythritol, tris-(hydroxyethyl) isocyanurate and N,N'-bis-(hydroxyethyl)oxamide.

1.9. Esters of β-(3,5-dicyclohexyl-4-hydroxyphenyl)-propionic acid with monohydric or polyhydric alcohols, for example methanol, octadecanol, 1,6-hexanediol, neopentyl glycol, thiodiethylene glycol, diethylene glycol, triethylene glycol, pentaerythritol, tris-(hydroxyethyl) isocyanurate and N,N'-bis-(hydroxyethyl)oxamide.

1.10. Amides of β-(3,5-di-tert-butyl-4-hydroxyphenyl)-propionic acid, for example N,N'-bis-(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)-hexamethylenediamine, N,N'-bis-(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)-trimethylenediamine and N,N'-bis-(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)-hydrazine.

2. UV absorbers and light stabilizers

2.1. 2-(2'-hydroxyphenyl)-benzotriazoles, for example the 5'-methyl-, 3',5'-di-tert-butyl-, 5'-tert-butyl-, 5'-(1,1,3,3-tetramethylbutyl)-, 5-chloro-3',5'-di-tert-butyl-, 5-chloro-3'-tert-butyl-5'-methyl-, 3'-sec-butyl-5'-tert-butyl-, 4'-octoxy-, 3',5'-di-tert-amyl-, 3',5'-bis-(α,α-dimethylbenzyl)- derivative.

2.2. 2-Hydroxybenzophenones, for example the 4-hydroxy, 4-methoxy-, 4-octoxy-, 4-decyloxy-, 4-dodecyloxy-, 4-benzyloxy-, 4,2',4'-trihydroxy- or 2'-hydroxy-4,4'-dimethoxy- derivative.

2.3. Esters of unsubstituted or substituted benzoic acids, for example 4-tert-butylphenyl salicylate, phenyl salicylate, octylphenyl salicylate, dibenzoylresorcinol, bis-(4-tert-butylbenzoyl)-resorcinol, benzoylresorcinol, 2,4-di-tert-butylphenyl 3,5-di-tert-butyl-4-hydroxybenzoate and hexadecyl 3,5-di-tert-butyl-4-hydroxybenzoate.

2.4. Acrylates, for example ethyl or isooctyl α-cyano-β,β-diphenylacrylate, methyl α-carbomethoxycinnamate, methyl or butyl α-cyano-β-methyl-p-methoxycinnamate, methyl α-carbomethoxy-p-methoxycinnamate or N-(β-carbomethoxy-β-cyanovinyl)-2-methylindoline.

2.5. Nickel compounds, for example nickel complexes of 2,2'-thiobis-[4-(1,1,3,3-tetramethylbutyl)-phenol], such as the 1: 1 complex or the 1: 2 complex, if appropriate with additional ligands, such as n-butylamine, triethanolamine or N-cyclohexyldiethanolamine, nickel dibutyldithiocarbamate, nickel salts of monoalkyl 4-hydroxy-3,5-di-tert-butylbenzylphosphonates, such as the methyl or ethyl ester, nickel complexes of ketoximes, such as 2-hydroxy-4-methylphenyl undecyl ketoxime, or nickel complexes of 1-phenyl-4-lauroyl-5-hydroxypyrazole, if appropriate with additional ligands.

2.6. Oxamides, for example 4,4'-di-octyloxyoxanilide, 2,2'-di-octyloxy-5,5'-di-tert-butyloxanilide, 2,2'-di-dodecyloxy-5,5'-di-tert-butyloxanilide, 2-ethoxy-2'-ethyloxanilide, N,N'-bis-(3-dimethylaminopropyl)-oxalamide, 2-ethoxy-5-tert-butyl-2'-ethyloxanilide and a mixture thereof with 2-ethoxy-2'-ethyl-5,4'-di-tert-butyloxanilide or mixtures of o-methoxy- and p-methoxy-disubstituted oxanilides and of o-ethoxy- and p-ethoxy-disubstituted oxanilides.

3. Metal deactivators, for example N,N'-diphenyloxamide, N-salicylal-N'-salicyloylhydrazine, N,N'-bis-(salicyloyl)-

hydrazine, N,N'-bis-(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)-hydrazine, 3-salicyloylamino-1,2,4-triazole and bis-(benzylidene)-oxalic acid dihydrazide.

4. Phosphites and phosphonites, for example triphenyl phosphite, diphenyl alkyl phosphites, phenyl dialkyl phosphites, tris-(nonylphenyl) phosphite, trilauryl phosphite, trioctadecyl phosphite, distearyl pentaerythritol diphosphite, tris-(2,4-di-tert-butylphenyl) phosphite, diisodecyl pentaerythritol diphosphite, bis-(2,4-di-tert-butylphenyl) pentaerythritol diphosphite, tristearyl sorbitol triphosphite, tetrakis-(2,4-ditert-butylphenyl) 4,4'-biphenylene diphosphonite and 3,9-bis-(2,4-di-tert-butylphenoxy)-2,4,8, 10-tetraoxa-3,9-diphosphaspiro[5.5]undecane.

5. Compounds which destroy peroxides, for example esters of β-thiodipropionic acid, for example the lauryl, stearyl, myristyl or tridecyl esters, mercaptobenzimidazole, the zinc salt of 2-mercaptobenzimidazole, zinc dibutyldithiocarbamate, dioctadecyl disulfide and pentaerythritol tetrakis-(β-dodecylmercapto)propionate.

6. Polyamide stabilizers, for example copper salts in combination with iodides and/or phosphorus compounds and salts of divalent manganese.

7. Basic co-stabilizers, for example melamine, polyvinylpyrrolidone, dicyandiamide, triallyl cyanurate, urea derivatives, hydrazine derivatives, amines, polyamides, polyurethanes, alkali and alkaline earth salts of higher fatty acids, for example Ca stearate, Zn stearate, Mg stearate, Na ricinoleate and K palmitate, antimony pyrocatecholate or tin pyrocatecholate.

8. PVC stabilizers, for example organotin compounds or salts of barium, cadmium, zinc and led.

Other materials such as are customary in the technology of plastics and paints can also be added. Examples of these are fillers and reinforcing agents, pigments, dyes, plasticizers, solvents, lubricants, flow-control agents, fluorescent brighteners, nucleating agents, antistatic agents or fire-retarding agents.

The invention also relates, therefore, to organic polymers containing, as stabilizers, a sterically hindered amine of the polyalkylpiperidine type and a hydroxyphenyltriazine of the formula I, and also to organic polymers containing a compound of the formula Ia as the stabilizer.

The polymers stabilized in this manner can be used in various shapes, for example as films, fibres, tapes, mouldings, profiles, latex, dispersions, paints or cements.

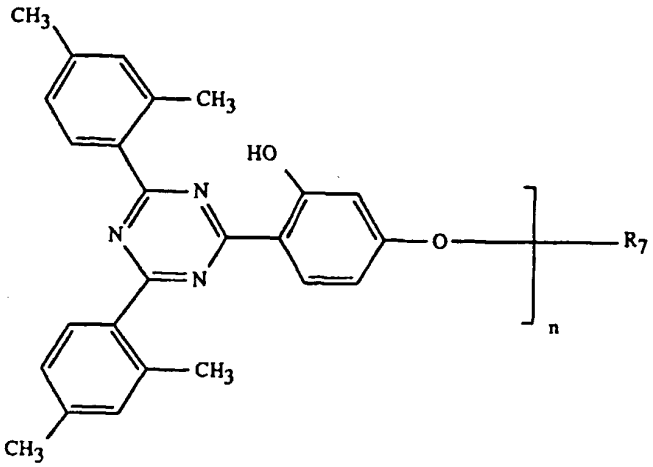
The following examples illustrate the invention in greater detail without intending to limit it to the examples. Parts and percentages are parts by weight and percentages by weight.

Preparation Examples

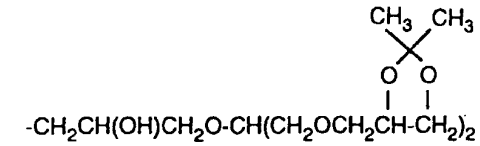
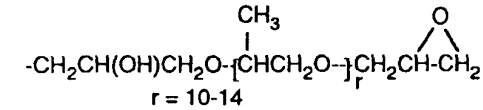
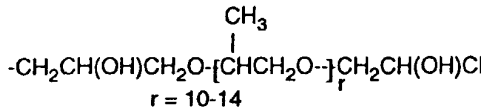
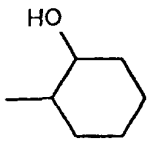
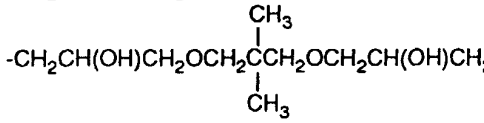
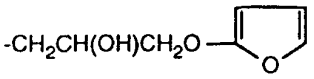
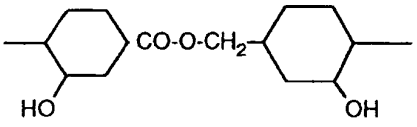
Example 1: 23.8 g (0.06 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis-(2,4-dimethylphenyl)-1,3,5-triazine (prepared as described in US Patent 3,244,708 Example 16) are suspended in 300 ml of xylene. 12.1 g (0.09 mol) of 97% butyl glycidyl ether and 0.75 g (0.006 mol) of dimethylbenzylamine are added to this suspension, and the mixture is heated to reflux temperature. After a reaction time of 5 hours the clear, brownish solution is cooled and clarified by filtration through 100 g of silica gel. The yellow solution is evaporated and the residue is recrystallized from hexane/toluene. This gives 27.3 g of pale yellow crystals of 2-[2-hydroxy-4(3-butoxy-2-hydroxypropyloxy)-phenyl]-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin (= 86% yield). Melting point: 80-83°C (Compound 1).

In analogous manner the compounds 2 to 28, listed in Table 1, are obtained from 2-(2,4-dihydroxyphenyl]-4,6-bis (2,4-dimethylphenyl)-1,3,5-triazine and an epoxy compound.

Table 1



Compound	n	R_7	Physical data
1	1	$-CH_2CH(OH)CH_2OC_4H_9$	m.p. 80-83°C
2	1	$-CH_2CH(OH)CH_2OCOC(CH_3)=CH_2$	m.p. 100-103°C
3	2	$-CH_2CH(OH)CH_2O-(CH_2)_4-OCH_2CH(OH)CH_2-$	m.p. 150-152°C
4	1	$-CH_2\underset{\displaystyle OH}{\underset{\vert}{CH}}(CH_2)_3CH_3$	m.p. 115-117°C
5	1	$-CH_2CH(OH)CH_2-OH$	m.p. 165-167°C
6	1	$-CH_2CH(OH)CH_2-O-C_6H_5$	m.p. 101-104°C
7	1	$-CH_2CH(OH)CH_2-O-CH_2\underset{\displaystyle C_2H_5}{\underset{\vert}{CH}}-C_4H_9$	m.p. 75-77°C
8	1	$CH_3(CH_2)_7\underset{\displaystyle OH}{\underset{\vert}{CH}}-\underset{\displaystyle \vert}{CH}-(CH_2)_7COOC_8H_{17}$	Oil found: C: 75.6 % H: 9.2 % calc.: C: 75.9 % H: 9.1 %
9	2	$-CH_2CH(OH)CH_2-O-C_6H_4-\underset{\displaystyle CH_3}{\underset{\vert}{\overset{\displaystyle CH_3}{\overset{\vert}{C}}}}-C_6H_4-O-CH_2CH(OH)CH_2-$	m.p. 100-103°C

Compound	n	R_7	Physical data
10	1	$-CH_2CH(OH)(CH_2)_{11}CH_3$	m.p. 102-104°C
11	1	$-CH_2CH(OH)(CH_2)_7CH_3$	m.p. 97-99°C
12	1		Oil found: calc.: C: 64.9 % C: 66.7 % H: 7.6 % H: 7.16% N: 4.4 % N: 5.4 %
13	1	 r = 10-14	Oil found: N: 3.75 % calc.: N: 3.43 %
14	2	 r = 10-14	Oil found: N: 5.17 % calc.: N: 5.18 %
15	1	$-CH_2CH(OH)CH_2OCOC_9H_{19}$	Oil found: N: 6.3 % calc.: N: 6.7 %
16	1		m.p. 152-155°C
17	1	$-CH_2CH(OH)CH_2O(C_{13}H_{27}$ to $C_{15}H_{31})$	Oil MS, NMR
18	1	$-CH_2CH(OH)CH_2O(C_{12}H_{25}$ to $C_{14}H_{29})$	Oil MS, NMR
19	2		Resin found: C=71.3%, H = 6.6% calc.: C=71.4%, H = 6.6%
20	1	$-CH_2CH(OH)CH_2OCOC_{10}H_{21}$-tert.	Resin MS, NMR
21	1	$-CH_2CH(OH)CH_2OCH_2CH=CH_2$	m.p. 94-95°C
22	1	$-CH_2CH(OH)CH_3$	m.p. 151-153°C
23	1		m.p. 99-101°C
24	2		Resin found: N= 8.2 % calc.: N= 8.3 %

Example 2: 22.1 g (0.05 mol) of 2-(2-hydroxy-4-hydroxyethoxy-phenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine (prepared as described in US Patent 3,244,708, Example 18), are dissolved in 300 ml of tetrahydrofurane at 40°C and 21 ml (0.15 mol) of triethylamine are added. A solution of 5.05 ml (0.053 mol) of acrylic acid chloride in 20 ml THF is added dropwise with stirring and with cooling the reaction mixture to 25-30°C. After further stirring of two hours the

precipitated ammonium salt is filtered off, the filtrate is evaporated and the residue recrystallized from toluene-hexane mixture to obtain 22 g (88.7% yield) of 2-(2-hydroxy-4-acryloyloxyethoxy-phenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine as slightly yellow crystals (compound No. 25), m.p. 128-129°C.

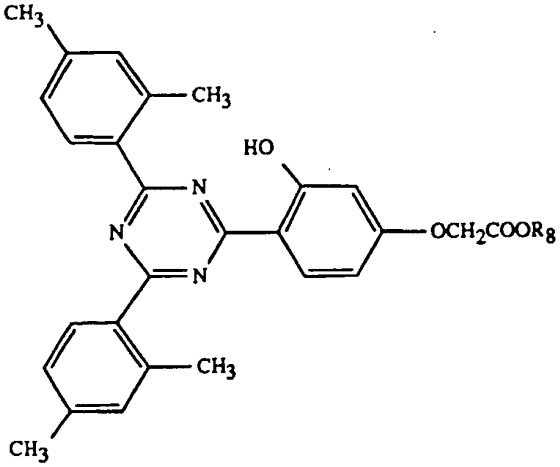
In analogous manner the compounds No. 26 and 27 were prepared.

Compound	n	R_7	Phys. data
25	1	$-CH_2CH_2OCOCH=CH_2$	m.p. 128-129°C
26	1	$-CH_2CH(CH_3)OCOCH=CH_2$	m.p. 128-129°C
27	1	$-CH_2CH_2OCOCH(CH_3)=CH_2$	m.p. 128-129°C

Example 3: 20 g (0.04 mol) of 2-(2-hydroxy-4-ethoxycarbonylmethoxyphenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine (prepared as described in US Patent 3,244,708, Example 19), are dissolved in 100 ml of toluene, and 5 g (0.048 mol) of 2-methylpentanol and 0.5 g of dibutyltin oxide as catalyst are added, and the mixture is heated to reflux temperature. In the course of this a toluene/ethanol mixture is distilled off. The toluene is replenished dropwise from a dropping funnel. The transesterification reaction is complete after 2 hours. The solution is cooled and filtered through 80 g of silica gel and is then evaporated. The residue is recrystallized from ethanol. This gives 14 g of the compound 28 (see Table 2). Melting point: 87-89°C.

Compounds 29 to 37 are obtained analogously by transesterification with the corresponding alcohols.

Table 2



Compound	R_8	Physical data		
28	$-CH_2CHCH_2CH_2CH_3$ CH_3	m.p. 87 -89°C		
29	$-CH_2CH_2CH_2CH_3$	m.p. 136 -138°C		
30	$-C_8H_{17}$ (isomer mixture)	Waxlike calcd. found	C 74.05% C 73.98%	H 7.28% H 7.36%	N 7.4% N 7.3%
31	$-(CH_2CH_2O)_nH$ n ≈ 7	Oil calcd. found	C 64.47% C 64.75%	H 6.99% H 7.00%	N 5.50% N 5.72%
32	$-C_{10}H_{21}$ (isomer mixture)	Waxlike calcd. found	C 74.59% C 74.76%	H 7.61% H 7.73%	N 7.05% N 6.89%
33	$-CH_2CH(CH_3)-OCH_2CH(CH_3)-OCH_2CH(CH_3)-CH_3$	Resin calcd. found	C 70.45% C 70.12%	H 7.06% H 7.02%	N 6.85% N 6.84%
34	$-CH_2-P(=O)(OC_4H_9)_2$	m.p. 75-78°C			
35	$-(CH_2)_8CH=CH-(CH_2)_7-CH_3$	Waxlike calcd. found	C 76.96% C 77.02%	H 8.42% H 8.47%	N 5.95% N 5.74%
36	$-(CH_2)_2O(CH_2)_2OC_6H_{13}$	Resin calcd. found	C 70.68% C 70.53%	H 7.37% H 7.49%	N 6.68% N 6.39%
37	$-(CH_2CH_2O)_nH$ n ≈ 9	Resin calcd. found	C 63.44% C 63.54%	H 7.22% H 7.20%	N 4.93% N 5.01%

Example 4: 9.1 g (0.02 mol) of 2-(2-hydroxy-4-carboxymethoxy-phenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine (prepared as described in US Patent 3,244,708, Example 16) are suspended in 40 ml of thionyl chloride, and 1 ml of DMF is added. The mixture is heated at reflux temperature for 2 hours. A clear yellow solution is formed with moderate evolution of gas. This solution is evaporated to give 9.5 g of [4-(4,6-di-2',4'-xylyl-s-triazin-2-yl)-3-hydroxyphenoxy]-

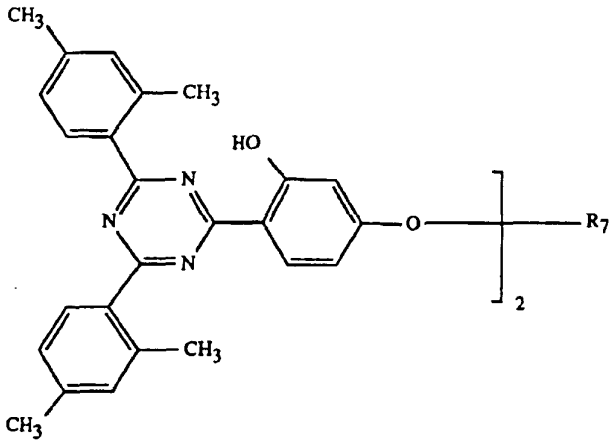
acetyl chloride (Compound 38). This acid chloride is dissolved in 100 ml of toluene. 19.3 g (0.08 mol) of bis-(2-ethylhexyl)-amine are added dropwise at room temperature. The reaction proceeds exothermically from 22°C to 40°C. The mixture is left for 1 hour at room temperature to complete the reaction. The product is then purified by column chromatography over silica gel. This gives approx. 5 g of a pale yellow, highly viscous oil, [4-(4,6-di-2',4'-xylyl-s-triazin-2-yl)-3-hydroxyphenoxy]-acetic acid bis-(2-ethylhexyl)-amide (Compound 39).

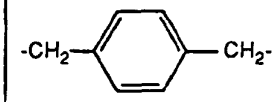
Calcd.	C 76.07%,	H 8.61%,	N 8.25%
Found.	C 75.91%,	H 8.46%,	N 8.16%

Example 5: 39.7 g (0.1 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine are dissolved in 250 ml of DMF. 20.7 g of potassium carbonate are added to this brownish solution. An orange suspension is formed. 17 g (0.052 mol) of 1,12-dibromododecane are added and the mixture is heated at 100°C. The reaction is complete after 2 hours. The cooled reaction solution is then poured into 1.5 l of water, and the precipitate is filtered off and washed with 2-3 times 100-200 ml of H_2O. The crystals are then recrystallized from xylene. Melting point: 158-163°C (Compound 40).

Compounds 41 and 42 are obtained analogously, using 1,6-dibromohexane, 1,4-dichloro-2-butene and p-xylylen-edibromid..

Table 3



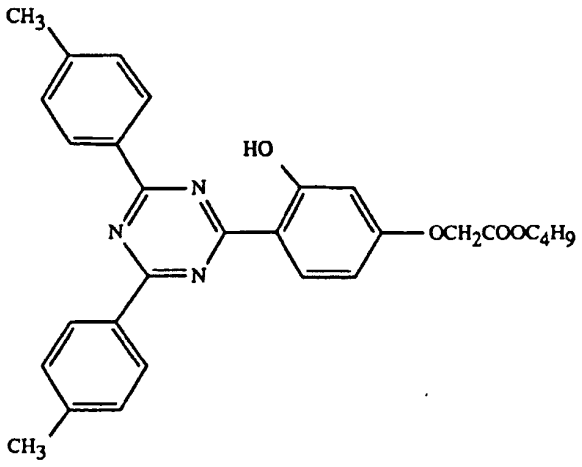
Compound	R_7	Physical data
40	$-(CH_2)_{12}-$	m.p. 158 - 163°C
41	$-(CH_2)_6-$	m.p. 203 - 205°C
42	$-CH_2-CH=CH-CH_2-$	m.p. 230 - 235°C
43		m.p. 252 - 254°C

Example 6: 20 g (0.05 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine are suspended in 100 ml of toluene, and 100 ml of 1N NaOH and 1 g of tetrabutylammonium bromide are added. The mixture is heated for 10 minutes at 80°C and then cooled, to give a yellow paste. 12.3 ml (0.15 mol) of epibromohydrin are added to this paste and the mixture is again heated for 6 hours at 50°C. When the reaction is complete, methylene chloride is added to the organic phase, which is separated off from the aqueous phase and filtered through Hyflo. It is then evaporated and the crystalline residue is recrystallized from toluene. This gives 14 g of pale yellow crystals, 2-(2-hydroxy-4-glycidyloxyphenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine (Compound 44), melting point 152-155°C.

Example 7: 9.07 g (0.02 mol) of Compound 44 and 7.95 g (0.02 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine are suspended in 150 ml of xylene. 0.2 g of dimethylaminopyridine are added and the mixture is heated at reflux temperature. The reaction is complete after 4 hours. The mixture is diluted with 200 ml of toluene and cooled. In the course of this the product is precipitated. It is filtered off and purified further by recrystallization from toluene together with a little Fuller's earth. This gives 9.1 g of pale beige crystals, 1,3-bis-{4-[4,6-di-(2,4-dimethylphenyl)-s-triazine-2-yl]-3-hydroxy-phenoxy}-2-hydroxypropane (Compound 45), melting point: 222-224°C.

Example 8: 18.5 g (0.05 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis-(4-methylphenyl)-1,3,5-triazine (Helv. Chim. Acta 55, 1566 (1972)) and 3.9 g (0.05 mol) of potassium methoxide are suspended in 200 ml of anhydrous n-butanol, and 7.4 g (0.06 mol) of butyl chloroacetate are added dropwise between 50°C and 100°C. After 17 hours under reflux the solvent is evaporated and the crude product is washed with water, dried and recrystallized from petroleum ether (boiling point 110°C-140°C) (Compound No. 46).
Melting point: 142-146°C.

Calcd.	C 72.03	H 6.04	N 8.69%
Found	C 71.88	H 6.01	N 8.81%



46

Example 9:

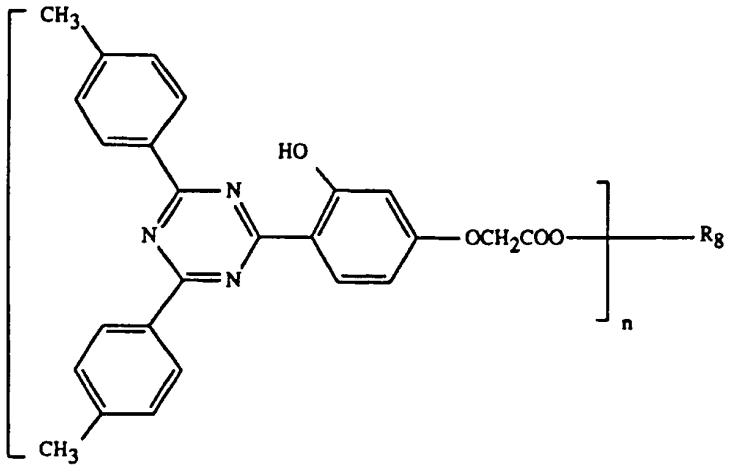
A) 55.4 g (0.15 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis-(4-methylphenyl)-1,3,5-triazine are dissolved in refluxing 2-butanone (1 l) in the presence of 27.6 g (0.2 mol) of K_2CO_3. A catalytic amount (0.2 g) of KI is added, and 36.8 g (0.3 mol) of ethyl chloroacetate are added dropwise over 1h30. After refluxing for 25 h, the reaction mixture is cooled in ice, the precipitate is filtered off, washed with water to neutrality and then with methanol. Drying in the oven yields the analytically pure 2-(2-hydroxy-4-ethoxycarbonylmethoxyphenyl)-4,6-bis-(4-methylphenyl)-1,3,5-triazine (54 g, m.p. 166-167°C) (Compound No. 47).

B) 11.4 g (0.025 mol) of compound 47 and 3.9 g (0.03 mol) of octanol (isomeric mixture) are refluxed in 120 ml xylene for 22 h in the presence of 0.62 g (2.5 mmol) of dibutyltinoxide. During the reaction a xylene/ethanol mixture is distilled off, the xylene being replenished dropwise from a dropping funnel. The reaction mixture is cooled to 40°C, filtered through a pad of Prolith and evaporated. Drying at 100°C/0.01 mmHg affords the transesterification product as a viscous yellow oil (12.5 g) that solidifies to a wax (Compound No. 48).

Calcd.	C = 73.44%,	H = 6.91%,	N = 7.79%
Found	C = 72.95%,	H = 6.70%,	N = 7.48%

Compounds No. 49 to 52 (Table 4) are obtained analogously by transesterification with the corresponding alcohols.

Table 4

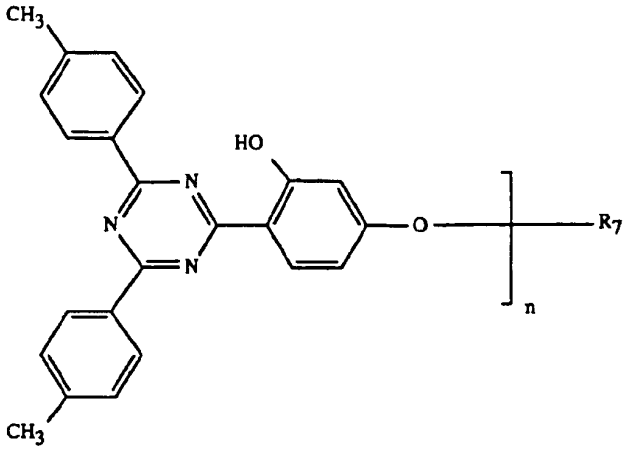


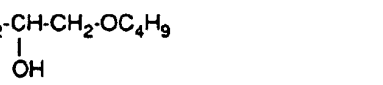
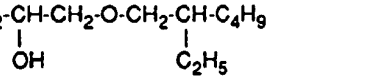
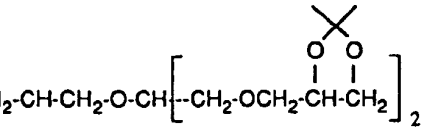
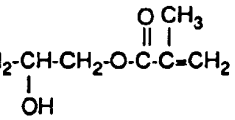
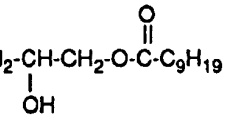
Compound	n	R_7	Physical data
49	1	$-CH_2CH_2OCH_3$	m.p. 150 - 153°C
50	1	$-CH_2CH_2OCH_2CH_2OC_2H_5$	m.p. 118 - 121°C
51	2	$-(CH_2)_6-$	m.p. 235 - 238°C
52	4	$-(CH_2)_4-C$	m.p. 219 - 231°C

Example 10: 40.6 g (0.11 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis-(4-methylphenyl)-1,3,5-triazine are dissolved in refluxing 2-butanone (500 ml) in the presence of 20.7 g (0.15 mol) of K_2CO_3. 18.1 g (0.055 mol) of 1,12-dibromodecane dissolved in 100 ml of 2-butanone are added dropwise over 3 h and the mixture is refluxed for 35 h. In the course of this, precipitation of the final product occurs. The reaction mixture is cooled in ice, the precipitate is filtered off, washed with water to neutrality and then with methanol. Drying in the oven affords 46.2 g of the analytically pure compound No. 53 (Table 5). Off-white solid, m.p. 219-220°C.

Analogous treatment with 1,6-dibromohexane or epibromohydrin gives compounds No. 54 and 55 (Table 5).

Table 5



Compound	n	R_7	Physical data
53	2	$-(CH_2)_{12}-$	m.p. 219-220°C
54	2	$-(CH_2)_6-$ 	m.p. 247-249°C
55	1		m.p. 205-208°C
56	1		m.p. 166-167°C
57	1		m.p. 123-125°C
58	1		Yellow oil calc. found C 66.02 % 64.52 % H 6.89 % 6.98 % N 5.63 % 5.23 %
59	1		m.p. 183-185°C
60	1		m.p. 135-138°C
61	2	$-OC-(CH_2)_8-CO-$	m.p. 220-228°C

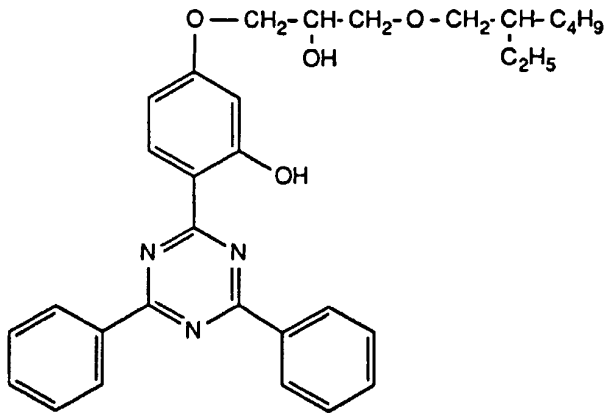
Example 11: A mixture of 14.8 g (0.04 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis-(4-methylphenyl)-1,3,5-triazine, 10.4 g (0.08 mol) of butylglycidylether and 2.1 g (6.5 mmol) of tetrabutylammoniumbromide is refluxed in 150 ml of 2-butanone during 85 h. The reaction mixture is cooled in ice, the precipitate is filtered off, washed with water and methanol, and dried in the oven. This yields 17.5 g of a pale yellow solid, m.p. 166-167°C (Compound No. 56, Table 4).

Analogous treatment with the corresponding glycidyl ethers or esters yields the compounds 57 to 60 (Table 4).

Example 12: A solution of 3.6 g (0.015 mol) of sebacyl chloride in 10 ml toluene is added dropwise at 10°C to a solution of 2-(2,4-dihydroxyphenyl)-4,6-bis(4-methylphenyl)-1,3,5-triazine and 3.3 g (0.033 mol) of triethylamine in 100 ml toluene and 50 ml of DMF. After 50 h at room temperature, the reaction mixture is diluted with water, filtered, the precipitate is washed with water, methanol and chloroform, and dried in the oven. 8.7 g of the diester 61 (Table 4) are obtained as a pale beige solid, m.p. 220-228°C.

Example 13: When 20.5 g (0.06 mol) of 2-(2,4-dihydroxyphenyl)-4,6-diphenyl-1,3,5-triazine are treated with 22.8 g (0.12 mol) of 2-ethylhexyl glycidyl ether analogously to example 11, 23.3 g of the pale yellow compound No. 62 (m. p. 116 to 118°C) are obtained.

62



Example 14: 7.9 g (0.02 mol) of 2-(2,4-dihydroxyphenyl)-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine, 5.7 g (0.02 mol) of a technical mixture of dodecyl, tridecyl and tetradecyl glycidyl ethers (Araldite® DY 025) and 0.15 g of ethyl triphenylphosphonium iodide in 50 ml of mesitylene are heated at 160-165°C for 10 hours, with stirring. The reaction solution is washed with water, dried over $MgSO_4$ and filtered. The filtrate is stirred for 2 hours with 2 g of Filtrol 4, filtered and evaporated in vacuo. The residue is freed from residual mesitylene at 120°C and 0.01 mmHg. This leaves 12.1 g of an oil (Compound No. 63).

$C_{41}H_{55}N_3O_4$	Calcd.	C 75.30	H 8.48	N 6.43%
	Found.	C 75.0	H 8.1	N 6.8%

Application Examples

Example 15: Stabilization of a 2-coat metallic coating

A clear lacquer is prepared by mixing the following components:

59.2	Parts of a commercial acrylic resin (Uracron® XB 2263, DMS Resins BV, NL) which is a 50% solution in xylene,
11.6	parts of a 90% melamine resin (Cymel® 327, Amer. Cyanamid Corp.)
19.4	parts of xylene
5.5	parts of butylgylcol acetate
9.3	parts of butanol
1.0	part of a levelling agent (Baysilon® A, Bayer AG) which is a 1% solution in xylene
100	parts lacquer containing 40% solids.

Samples of this laquer are mixed with 0.5% (related to the solids) of di(1,2,2,6,6-pentamethylpiperidin-4-yl) sebacate (= HA-1) and 1,5% (related to the solids) of a triazine stabilizer listed in table 6.

The clear lacquer is diluted to a sprayable state with a mixture of 13:6:1 xylene/butanol/butyl glycol acetate and

is sprayed onto a previously prepared aluminum sheet (coil-coated and primed with a silver-metallic paint based on polyester/cellulose acetobutyrate/melamine resin), and the sheet is baked for 30 minutes at 130°C. This results in a dry film thickness of 40-50 µm of clear lacquer. A clear lacquer containing no light stabilizer is used as a comparison.

The samples are exposed in a UVCON, Type UVB-313, weathering equipment with a cycle of 8 hrs of dry UV irradiation at 70°C and 4 hrs of condensation at 50°C. The 20°-gloss of the samples is measured in certain intervals of weathering time using the method of DIN 67530. The results are given in Table 6.

Table 6

Piperidin Stabilizer	Triazine Stabilizer (Compound No.)	20°-Gloss after exposure of				
		0	1600	3200	4800	6400 hrs
-	-	86	31	-	-	-
0.5 % HA-1	1.5 % 1	86	79	74	77	61
0.5 % HA-1	1.5 % 30	86	74	68	66	57
0.5 % HA-1	1.5 % 32	82	69	72	68	59
0.5 % HA-1	1.5 % 33	85	79	74	72	64

Example 16

The preparation of the samples and their testing is the same as in Example 15. As comparison C-1 and C-2, two triazine derivatives known from US Patent 4,619,956, are used as triazine stabilizers.

C-1 = 2-(2-hydroxy-4-dodecyloxyphenyl)-4,6-diphenyl-1,3,5-triazine
C-2 = 2-(2-hydroxy-4-octadecyloxyphenyl)-4,6-diphenyl-1,3,5-triazine

The results are shown in Table 7.

Table 7

Piperidin Stabilizer	Triazine Stabilizer	20°-Gloss after exposure of			
		0	1600	3200	4000 hrs
-	-	84	19	-	-
0.5 % HA-1	1.5 % Compound 34	84	80	78	59
0.5 % HA-1	1.5 % Compound 35	85	81	80	75
0.5 % HA-1	1.5 % Compound 36	85	80	78	76
0.5 % HA-1	1.5 % Compound 37	85	80	79	77
0.5 % HA-1	1.5 % Compound 39	85	81	72	74
0.5 % HA-1	1.5 % C-1	85	54	35	37
0.5 % HA-1	1.5 % C-2	79	38	34	37

Example 17:

A similar clear lacquer is prepared from

54.5	parts of Uracron® XB 2263
16.3	parts of Cymel® 327
19.4	parts of xylene
5.5	parts of butylgylcol acetate
3.3	parts of butanol
1	part of Baysilon® A
100	parts lacquer containing 41.5% solids.

Samples of this laquer are mixed with 0.5% (related to the solids) of HA-1 and 1.5% (related to the solids) of a triazine stabilizer listed in Table 8. The lacquer is diluted to a sprayable state by diluting with a 13:6:1 mixture of xylene/butanol/butylglycol acetate and is sprayed onto an aluminium sheet which is coil coated and primed with a metallic blue commercial paint (Glasomax®, Glasurit GmbH, Münster). After baking for 30 minutes at 130°C the clear lacquer

layer has a thickness of 40-45 µm.

The samples are weathered in a UVCON, Type UVB 313, as described in Example 15 and the 20°-gloss of the weathered samples is measured according to method DIN 67530. The results are shown in Table 8.

Table 8

Piperidin Stabilizer	Triazine Stabilizer(Compound No.)	20°-Gloss after exposure of			
		0	800	1600	2000 hrs
-	-	85	75	42	20-
0.5 % HA-1	1.5 % 4	86	80	78	78
0.5 % HA-1	1.5 % 6	87	81	81	81
0.5 % HA-1	1.5 % 7	85	81	81	79
0.5 % HA-1	1.5 % 10	86	82	80	80
0.5 % HA-1	1.5 % 11	86	81	81	78
0.5 % HA-1	1.5 % 17	86	81	81	81
0.5 % HA-1	1.5 % 18	87	81	80	80
0.5 % HA-1	1.5 % 62	84	80	78	81

Example 18

The two-coat samples are prepared as described in Example 15, however, no piperidin stabilizer is added. The samples are weathered in a Weatherometer with cycle CAM 159 and with using an edge filter of type A. Measured is the 20°-gloss before and after exposure, the results are shown in Table 9.

Table 9

Triazine Stabilizer (Compound No.)	20°-Gloss after exposure of		
	0	2000	3600 hrs
none	85	47	25
34	86	71	64
35	86	72	61
36	86	73	60

Example 19

The two-coat samples are prepared as described in Example 17, however, no piperidin stabilizer is added. The samples are weathered in a UVCON, type UVB-313 with cycle of 8 hrs of UV irradiation at 70°C and 4 hrs of condensation at 50°C. The 20°-gloss of the sample is measured according to method DIN 67530 before and after exposure. Further the change of colour shade ΔE after exposure is measured according to method DIN 6174. The results are shown in Table 10.

Table 10

Triazine Stabilizer	20°-Gloss after exposure of			ΔE
(Compound No.)	0	800	1600 hrs	after 1600 h
none	85	75	42	6.6
6	84	80	80	1.3
7	84	81	80	1.3
17	86	81	80	1.6
18	86	81	80	1.4
62	86	82	81	1.0

Example 20: Stabilization of a radiation-curable system

A clear laquer is prepared by mixing 14 parts of tris(2-acryloyloxyethyl)isocyanurate with 6 parts of 1,6-hexanediol diacrylate and 0.4 parts of 1-benzoylcyclohexanol (as photoinitiator). A triazine stabilizer is added in an amount of 1.5%. The lacquer is coated to a white coil-coated aluminium sheet in a dry-thickness of about 40 µm.

The samples are hardened by UV irradiation in a PPG processor (2 × 80 W/cm, 2 × 10 m (min) and weathered

in a UVCON, type UVB-313 with a cycle of 4 hours of UV irradiation at 60°C and 4 hrs of condensation at 50°C.

The yellowness index (method ASTM D 1925-70) of the samples is measured before and after the exposure. The results are shown in Table 11.

Table 11

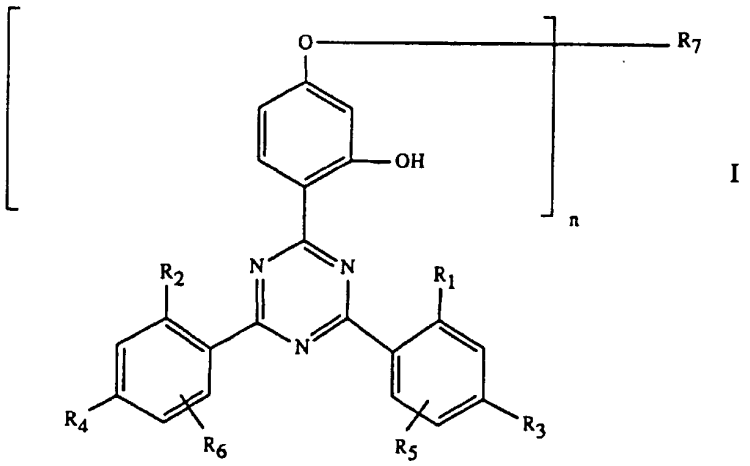
Triazine Stabilizer (Compound No.)	Yellowness Index after exposure of			
	0	200	400	600 hrs
none	-1.0	19.6	28.0	35.3
1.5 % 17	-0.6	1.8	1.8	2.1

Claims

Claims for the following Contracting States : AT, BE, CH, DE, FR, GB, IT, LI, NL

1. An organic material which has been stabilized against damage caused by light, heat and oxygen and which contains

(a) at least one sterically hindered amine of the polyalkylpiperidine type and
(b) at least one o-hydroxyphenyl-s-triazine, wherein the triazine compound (b) is a compound of the formula I

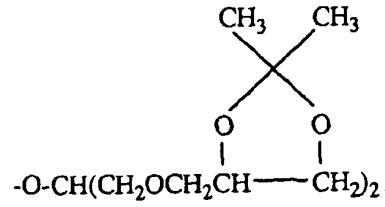


I

in which n is 1 to 4,

R_1 and R_2 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl or trifluoromethyl,
R_3 and R_4 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl, C_1-C_{18}alkoxy or halogen and, in the event that n = 1, can also be a radical -OR_7,
R_5 and R_6 independently of one another are H, C_1-C_{12}alkyl or halogen, R_7, if n is 1, is

a) C_1-C_{18}alkyl which is substituted by one or more of the groups OH, C_1-C_{18}alkoxy, C_3-C_{18}alkenoxy, halogen, phenoxy (which is unsubstituted or substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen), furyloxy,

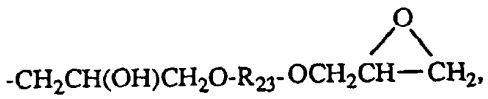


-COOH, -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, -NHR_9, -$N(R_9)(R_{10})$, -$NHCOR_{11}$, -CN and/or by -O-CO-R_{11},

b) C_4-C_{50}alkyl which is interrupted by one or more O and can be substitued by OH or/and glycidyloxy,

c) C_3-C_6alkenyl,

d) glycidyl or a group



e) cyclohexyl which is unsubstituted or substituted by OH or -$OCOR_{11}$,

f) C_7-C_{11}phenylalkyl which is unsubstituted or substituted by OH,Cl or CH_3,

g) -CO-R_{12} or

h) -SO_2-R_{13},

and if n is 2, R_7 is

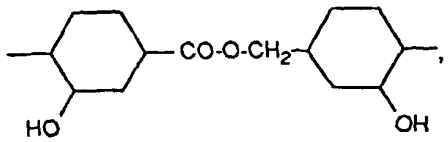
a) C_2-C_{16}alkylene,

b) C_4-C_{12}alkenylene,

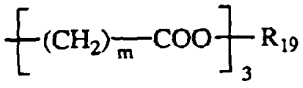
c) xylylene,

d) C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH,

e) a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CO-NH-R_{17}-NH-CO- or -$(CH_2)_m$-COO-R_{18}-OOC-$(CH_2)_m$ -(in which m is 1 to 3) or

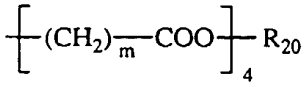


and if n is 3, R_7 is a group



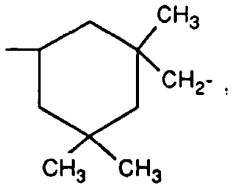
m = 1-3,

and if n is 4, R_7 is a group

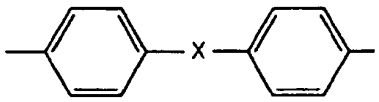


m = 1-3,

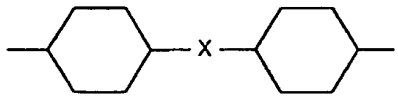
R_8 is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by one or more O, N or S and/or substituted by OH, C_1-C_4alkyl which is substituted by -P(O)$(OR_{14})_2$, -N$(R_9)(R_{10})$ or -OCOR_{11} and/or OH, C_3-C_{18}alkenyl, glycidyl or C_7-C_{11}phenylalkyl,
R_9 and R_{10} independently of one another are C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or R_9 and R_{10} together are C_3-C_9alkylene or C_3-C_9oxaalkylene or C_3-C_9azaalkylene,
R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,
R_{12} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl, phenyl, C_1-C_{12}alkoxy, phenoxy, C_1-C_{12}alkylamino or C_6-C_{12}arylamino or a group -R_{24}-COOH or -NH-R_{17}-NCO,
R_{13} is C_1-C_{12}alkyl, C_6-C_{12}aryl or C_7-C_{14}alkaryl,
R_{14} is C_1-C_{12}alkyl or phenyl,
R_{15} is C_2-C_{10}alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, phenylene or a group -phenylene-X-phenylene- in which X is -O-, -S-, -SO_2-, -CH_2- or -$C(CH_3)_2$-,
R_{16} is C_2-C_{10}alkylene, C_2-C_{10}oxaalkylene or C_2-C_{10}thiaalkylene,C_6-C_{12}arylene or C_2-C_6alkenylene,
R_{17} is C_2-C_{10}alkylene, phenylene, tolylene, diphenylenemethane or a group



R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by one or more O,
R_{19} is C_3-C_{12}alkanetriyl,
R_{20} is C_4-C_{12}alkanetetryl,
R_{23} is $C_{2\text{-}10}$alkylene, phenylene or a group



or

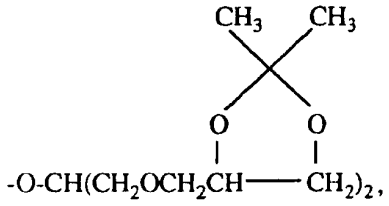


wherein X is O, S, SO_2, CH_2 or $C(CH_3)_2$, and
R_{24} is C_2-C_{14}alkylene, vinylene or o-phenylene.

2. An organic material according to claim 1, wherein the triazine compound (b) is a compound of the formula I in which n is 1 to 4, R_1 and R_2 independently of one another are H, OH or C_1-C_4alkyl, R_3 and R_4 independently of one another are H, OH, C_1-C_4alkyl, C_1-C_4alkoxy, halogen or a radical -OR_7, R_5 and R_6 independently of one another are H or C_1-C_4alkyl,

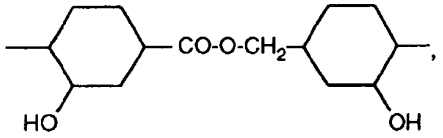
R_7, if n is 1, is

a) C_1-C_{18}alkyl which is substituted by one or more of the groups OH, C_1-C_{18}alkoxy, allyloxy, phenoxy, furyloxy,

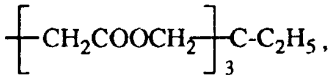


-$COOR_8$, -$CON(R_9)(R_{10})$ and/or by -$OCOR_{11}$,
b) C_4-C_{50}alkyl which is interrupted by one or more O and can be substituted by OH or/and glycidyloxy,
c) allyl, glycidyl or benzyl,
d) cyclohexyl or hydroxycyclohexyl,

and if n is 2, R_7 is C_4-C_{12}alkenylene, C_4-C_6alkenylene, xylylene, C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH, or R_7 is a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CH_2-COO-$R_{18}O$-R-CH_2-or

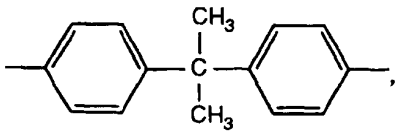


and if n is 3, R_7 is a group



and if n is 4, R_7 is a group

R_8 is C_1-C_{12}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by one or more O and/or substituted by OH or R_8 is C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$,
R_9 and R_{10} are C_1-C_6alkyl or R_9 and R_{10} together are pentamethylene or 3-oxapentamethylene,
R_{11} is C_1-C_{12}alkyl, C_2-C_5alkenyl or phenyl,
R_{14} is C_1-C_{12}alkyl,
R_{15} is C_2-C_8alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, or is a group

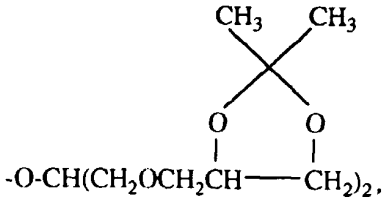


R_{16} is C_2-C_8alkylene, C_2-C_6oxaalkylene or C_2-C_6thiaalkylene and R_{18} is C_4-C_8alkylene or C_4-C_{12}alkylene which is interrupted by one or more O.

3. An organic material according to claim 1, wherein the triazine compound (b) is a compound of the formula I in which n is 1, 2 or 4, R_1 and R_2 independently of one another are H or CH_3, R_3 and R_4 independently of one another are H, CH_3 or Cl, R_5 and R_6 are hydrogen,

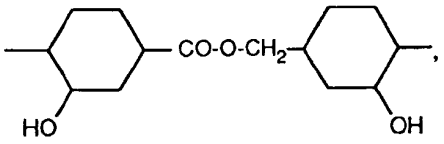
R_7, if n is 1, is

a) C_1-C_{14}alkyl which is substituted by one or more of the groups OH, C_1-C_{15}alkoxy, allyloxy, phenoxy, furyloxy,



-$COOR_8$, -$CON(R_9)(R_{10})$ and/or by -$OCOR_{11}$,
b) C_6-C_{45}alkyl which is interrupted by one or more O and can be substituted by OH or/and glycidyloxy,
c) glycidyl or
d) hydroxycyclohexyl,

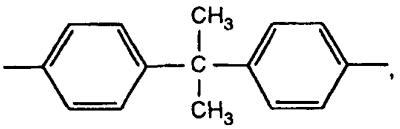
and if n is 2, R_7 is C_6-C_{12}alkenylene, 2-butenylene-1,4, xylylene, C_3-C_{20}alkylene which is interrupted by one or more O or substituted by OH, or R_7 is a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CH_2-COO-R_{10}-OOC-CH_2-or



and if n is 4, R_7 is

R_8 is C_4-C_{10}alkyl, oleyl, C_3-C_{20}alkyl which is interrupted by one or more O and/or substituted by OH, or R_8 is -$CH_2P(O)(OR_{14})_2$,
R_9 and R_{10} are C_2-C_6alkyl
R_{11} is C_6-C_{10}alkyl, C_2-C_3alkenyl

R_{14} is C_1-C_{12}alkyl,
R_{15} is C_2-C_8alkylene, C_{10}-C_{45}alkylene which is interrupted by more than one O, or is a group

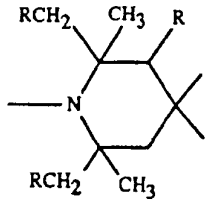


R_{16} is C_4-C_8alkylene and R_{18} is C_4-C_8alkylene.

4. An organic material according to claim 1, wherein the component (b) is a compound of the formula I in which n is 1 or 2 and, if n is 1, R_7 is a group $-CH_2CH(OH)CH_2-OR_{21}$ in which R_{21} is C_1-C_{18}alkyl, allyl, phenyl, furyl, C_6-C_{12}alkanoyl or C_3-C_5alkenoyl and, if n is 2, R_7 is a group $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$ in which R_{15} is as defined in claim 1.

5. An organic material according to claim 1, wherein the component (b) is a compound of the formula I in which R_1 and R_2 are hydrogen or methyl, R_3 and R_4 are hydrogen, chlorine or methyl and R_5 and R_6 are hydrogen.

6. An organic material according to claim 1, wherein the component (a) is a compound containing at least one group of the formula



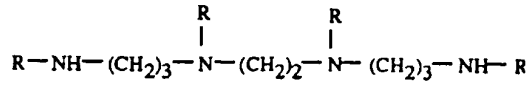
in which R is hydrogen or methyl.

7. An organic material according to claim 6, wherein R is hydrogen.

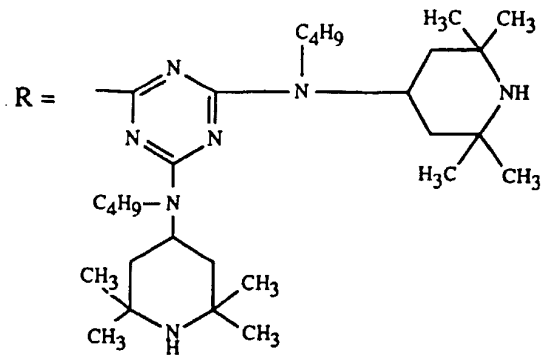
8. An organic material according to claim 6, wherein the component (a) is one of the following compounds:

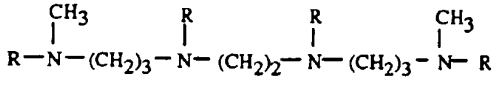
Di-(2,2,6,6-tetramethylpiperidin-4-yl) succinate,
Di-(2,2,6,6-tetramethylpiperidin-4-yl) sebacate,
Di-(1,2,2,6,6-pentamethylpiperidin-4-yl) sebacate,
Di-(1,2,2,6,6-pentamethylpiperidin-4-yl) butyl-(3,5-di-tert-butyl-4-hydroxybenzyl)-malonate,
Di-(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl) sebacate,
Tetra-(2,2,6,6-tetramethylpiperidin-4-yl) butane-1,2,3,4-tetracarboxylate,
Tetra-(1,2,2,6,6-pentamethylpiperidin-4-yl) butane-1,2,3,4-tetracarboxylate,
N-(2,2,6,6-Tetramethylpiperidin-4-yl)-β-aminopropionic acid dodecyl ester,
N-(1-Octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)-N'-dodecyl-oxalamide
N-(2,2,6,6-Tetramethylpiperidin-4-yl)-α-dodecylsuccinimide,
2,2,4,4-Tetramethyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]heneicosane,
8-Acetyl-3-dodecyl-1,3,8-triaza-7,7,9,9-tetramethylspiro[4.5]decane-2,4-dione,
20-(Dodecyloxycarbonylethyl)-2,2,4,4-tetramethyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]heneicosane,

or a compound of the formulae

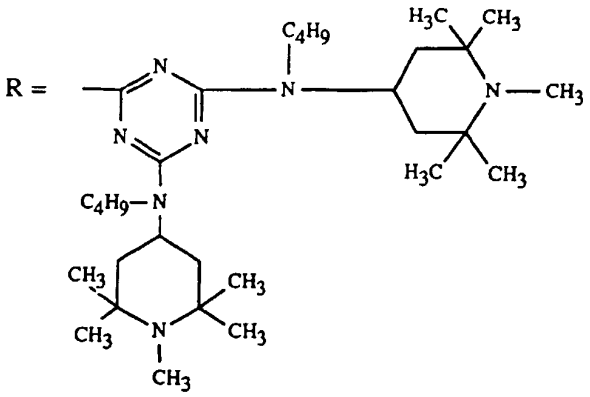


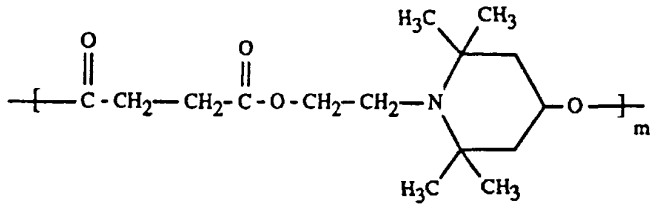
in which

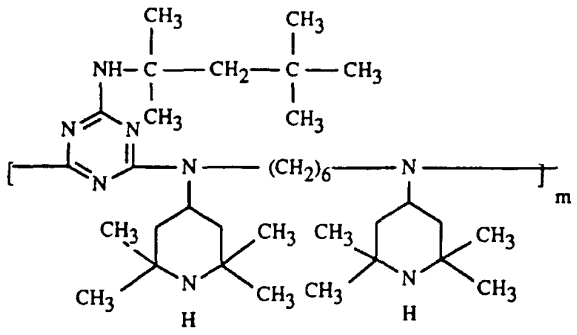


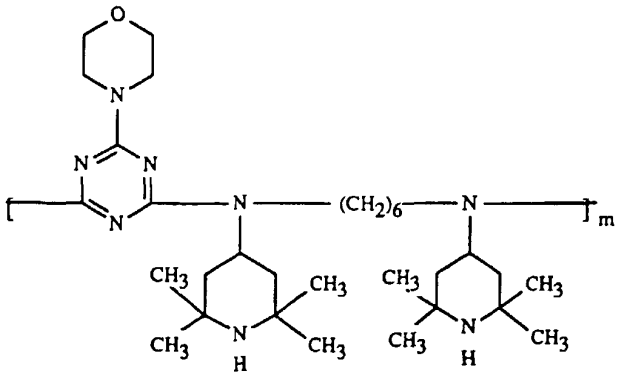


in which

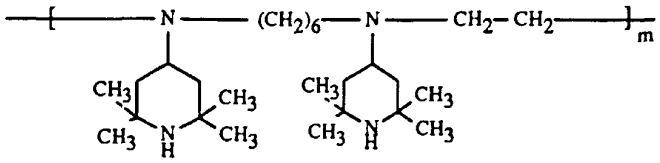








or



9. An organic material according to claim 1, which contains 0.01 to 5% by weight of the component (a) and 0.02 to 5% by weight of the component (b), relative to the material.

10. An organic material according to claim 9, which contains 0.02 to 2% by weight of the component (a) and 0.05 to

3% by weight of the component (b).

11. An organic material according to claim 1, wherein the material is an organic polymer.

12. An organic polymer according to claim 11, which, in addition to the components (a) and (b) also contains further stabilizers, fillers, reinforcing agents, pigments, dyes, plasticizers, solvents, lubricants, flow-control agents, fluorescent brighteners, nucleating agents, antistatic agents or fire-retarding agents.

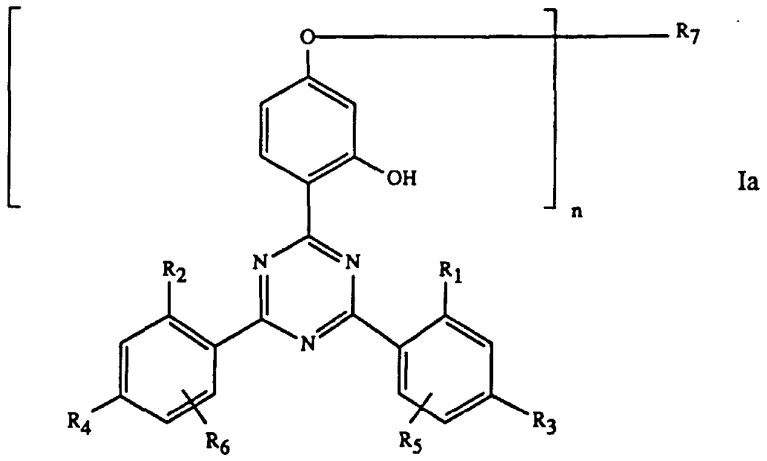
13. An organic polymer according to claim 11, wherein the polymer is a coating binder.

14. An organic material according to claim 1, wherein the material is a radiation-curable coating material.

15. A radiation-curable coating material containing a hydroxyphenyltriazin of formula I as defined in claim 1 in the absence of a sterically hindered amine.

16. A process for stabilizing organic material against damage caused by light, heat and oxygen by the addition of the components (a) and (b) as defined in claim 1.

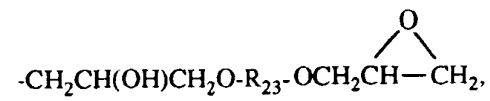
17. A compound of the formula Ia



in which n is 1 to 4,

R_1 and R_2 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl or trifluoromethyl,
R_3 and R_4 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl, C_1-C_{18}alkoxy or halogen and, in the event that n = 1, can also be a radical -OR_7,
R_5 and R_6 independently of one another are H, C_1-C_{12}alkyl or halogen,
R_7, if n is 1, is

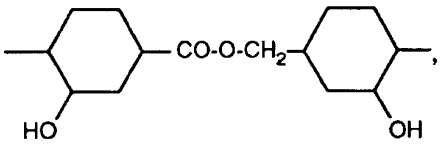
a) C_1-C_{12}alkyl which is substituted by phenoxy (which is unsubstituted or substituted by C_1-C_{18}allyl, C_1-C_{18}alkoxy or halogen) or by a group -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, NHR_9, -$N(R_9)(R_{10})$ or -O-CO-R_{22},
b) C_4-C_{50}alkyl which is interrupted by more than one O and can be substituted by OH or/and glycidyloxy,
c) glycidyl or a group



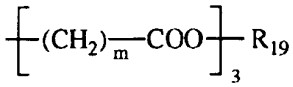
d) cyclohexyl substituted by OH or $-OCOR_{11}$
e) a group $-CH_2CH(OH)CH_2OR_{21}$
f) a group $-SO_2-R_{13}$,
g) a group $-CO-R_{12}$

and if n is 2, R_7 is

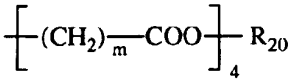
a) C_2-C_{12}alkylene,
b) C_4-C_{12}alkenylene,
c) xylylene,
d) C_3-C_{20}alkylene which is interrupted by one or more 0 and/or substituted by OH,
e) a group $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (wherein m is 1-3) or



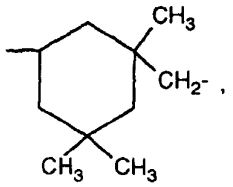
and if n is 3, R_7 is a group



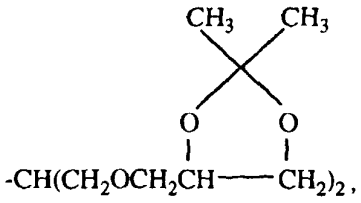
(wherein m is 1-3),
and if n is 4, R_7 is a group



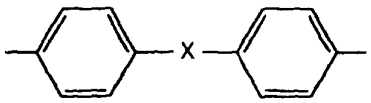
(wherein m is 1-3),
R_8 is C_3-C_{20}alkyl which is interrupted by one or more O, N or S and can be substituted by OH, or R_8 is C_1-C_4alkyl which is substituted by $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$, or $-OCOR_{11}$, or R_8 is C_3-C_{18}alkenyl, glycidyl or C_7-C_{11}phenylalkyl,
R_9 and R_{10} independently are C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or R_9 and R_{10} together are C_3-C_9alkylene or C_3-C_9-oxaalkylene or C_3-C_9azaalkylene,
R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,
R_{12} is a group $-R_{24}-COOH$ or $-NH-R_{17}-NCO$,
R_{13} is C_1-C_{12}alkyl, C_6-C_{12}aryl or C_7-C_{14}alkaryl
R_{14} is C_1-C_{12}alkyl or phenyl
R_{15} is C_2-C_{10}alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, or R_{15} is phenylene or a group -phenylene-X-phenylene in which X is -O-, -S-, $-SO_2-$, $-CH_2-$ or $-C(CH_3)_2-$,
R_{17} is C_2-C_{10}alkylene, phenylene, tolylene, diphenylenemethane or a group



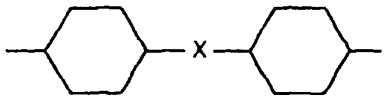
R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by one or more O,
R_{19} is C_3-C_{12}alkanetriyl,
R_{20} is C_4-C_{12}alkanetetryl,
R_{21} is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, phenyl, phenyl substituted by C_1-C_{12}alkyl, C_1-C_{12}alkoxy or halogen, or R_{21} is C_2-C_{19}alkanoyl, benzoyl, C_3-C_{18}alkenoyl, furyl or a group



R_{22} is C_2-C_5alkenyl,
R_{23} is C_2-C_{10}alkylene, phenylene or a group



or



wherein X is O, S, SO_2, CH_2 or $C(CH_3)_2$, and
R_{24} is C_2-C_{14}alkylene, vinylene or o-phenylene.

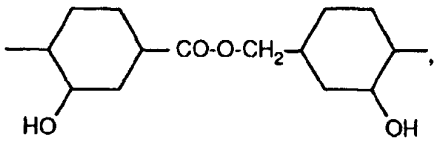
18. A compound of the formula Ia according to claim 17, in which n is 1 or 2,

R_1 and R_2 independently of one another are H, OH, C_1-C_{12}alkyl or halogenomethyl,
R_3 and R_4 independently of one another are H, OH, C_1-C_{12}alkyl, C_1-C_{18}alkoxy or halogen and, in the event that n = 1, can also be a radical $-OR_7$,
R_5 and R_6 independently of one another are H, C_1-C_{12}alkyl or halogen,
R_7 is C_1-C_{12}alkyl which is substituted by phenoxy which is unsubstituted or substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen, C_1-C_{12}alkyl which is substituted by $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$ or $-N(R_9)(R_{10})$, C_6-C_{20}alkyl which is interrupted by more than one O and is substituted by OH, glycidyl, cyclohexyl substituted by OH or $-OCOR_{11}$, a group $-CH_2CH(OH)CH_2OR_{21}$ or SO_2R_{13}, if n is 1, and, if n is 2, is C_2-C_{12}alkylene, C_4-C_{12}alkenylene, xylylene, C_3-C_{20}alkylene which is interrupted by O and/or substituted by OH, or a group $-CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$- or $-(CH_2)_m$-COO-R_{18}-OOC-$(CH_2)_m$- in which m

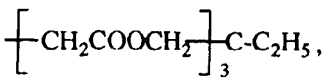
is 1-3,
R_8 is C_3-C_{20}alkyl which is interrupted by O, N or S and/or substituted by OH, C_1-C_4alkyl which is substituted by $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ or $-OCOR_{11}$, C_3-C_{18}alkenyl, glycidyl or C_7-C_{11}phenylalkyl,
R_9 and R_{10} independently of one another are C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or R_9 and R_{10} together are C_3-C_9alkylene or C_3-C_9oxaalkylene or C_3-C_9azaalkylene,
R_{11} is C_1-C_{18}alkyl, C_2-C_{16}alkenyl or phenyl,
R_{13} is C_1-C_{12}alkyl, C_6-C_{12}aryl or C_7-C_{14}alkaryl,
R_{14} is C_1-C_{12}alkyl or phenyl,
R_{15} is C_2-C_{10}alkylene, phenylene or a group -phenylene-X-phenylene in which X is -O-, -S-, $-SO_2$-, $-CH_2$- or $-C(CH_3)_2$,
R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by O, and
R_{21} is C_1-C_{18}alkyl, phenyl, phenyl which is substituted by C_1-C_{12}alkyl, C_1-C_{12}alkoxy or halogen, C_2-C_{12}alkanoyl, benzoyl or C_3-C_5alkenoyl.

19. A compound according to claim 17 of the formula Ia in which n is 1 to 4, R_1 and R_2 independently of one another are H, OH or C_1-C_4alkyl, R_3 and R_4 independently of one another are H, OH, C_1-C_4alkyl, C_1-C_4alkoxy, halogen or a radical $-OR_7$, R_5 and R_6 independently of one another are H or C_1-C_4alkyl,

R_7, if n is 1, is C_1-C_6alkyl which is substituted by $-COOR_8$, $-COONHR_9$, $-CON(R_9)(R_{10})$ or $-OCOR_{22}$, or R_7 is glycidyl, hydroxycyclohexyl or a group $-CH_2CH(OH)CH_2OR_{21}$, and if n is 2, R_7 is C_4-C_{12}alkyllene, C_4-C_6alkenylene, xylylene, C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH, or R_7 is a group $-CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, $-CH_2$-COO-R_{18}-$OOCCH_2$- or



and if n is 3, R_7 is a group

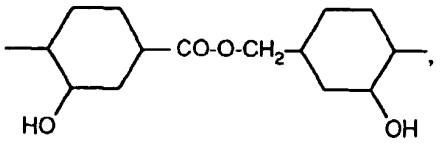


and if n is 4, R_7 is a group

R_8 is C_3-C_{20}alkyl which is interrupted by one or more O and can be substituted by OH or R_8 is C_1-C_4alkyl which is substituted by $-P(O)(OR_{14})_2$ or R_8 is C_3-C_{18}alkenyl,
R_9 and R_{10} independently are C_1-C_8alkyl or cyclohexyl or R_9 and R_{10} together are pentamethylene or 3-oxa-pentamethylene,
R_{14} is C_1-C_{12}alkyl,
R_{15} is C_2-C_8alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, or R_{15} is a group -phenylene-X-phenylene- in which X is -O-, $-CH_2$- or $-C(CH_3)_2$-,
R_{18} is C_4-C_8alkylene or C_4-C_{12}alkylene which is interrupted by one or more 0,
R_{21} is C_4-C_{18}alkyl, allyl, phenyl, furyl, C_5-C_{19}alkanoyl or C_3-C_5alkenoyl and R_{22} is C_2-C_5alkenyl.

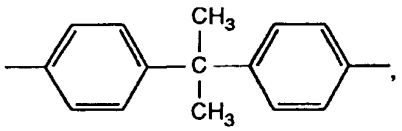
20. A compound according to claim 17 of the formula Ia in which n is 1, 2 or 4, R_1 and R_2 independently of one another are H or CH_3, R_3 and R_4 independently of one another are H, CH_3 or Cl, R_5 and R_6 are hydrogen,

R_7, if n is 1, is C_1-C_4alkyl which is substituted by -$COOR_8$, -$CON(R_9)(R_{10})$ or -O-COR_{22}, or R_7 is glycidyl, 2-hydroxycyclohexyl or a group -$CH_2CH(OH)CH_2OR_{21}$,
and if n is 2, R_7 is C_6-C_{12}alkylene, 2-butene-1,4-ylene, xylylene or C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH, or R_7 is a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CH_2-COO-R_{18}-$OOCCH_2$- or



and if n is 4, R_7 is a group

R_8 is C_3-C_{20}alkyl which is interrupted by one or more O and can be substituted by OH or R_8 is -$CH_2P(O)(OR_{14})_2$ or oleyl
R_9 and R_{10} are C_2-C_6alkyl
R_{15} is C_2-C_8alkylene, C_{10}-C_{45}alkylene which is interrupted by one or more 0 or is a group



R_{18} is C_4-C_8alkylene,
R_{21} is C_4-C_{15}alkyl, allyl, phenyl, furyl, C_5-C_{12}alkanoyl or C_3-C_5alkenoyl and R_{22} is C_2-C_3alkenyl.

21. A compound according to claim 17 of the formula Iain which n is 2.

22. A process for stabilizing organic material, in particular organic polymers, against damage caused by light, heat and oxygen, by the addition of an o-hydroxyphenyl triazine, which comprises adding at least one compound of the formula Ia according to claim 17.

23. An organic material containing at least one compound of the formula Ia according to claim 17 as a stabilizer against damage caused by light, heat and oxygen.

24. An organic polymer as a material according to claim 23.

25. An organic material according to claim 23, containing 0.01 to 10 % by weight of a compound of the formula Ia, relative to the material.

26. A polycarbonate according to claim 24.

27. An organic material according to claim 23 which is a radiation-curable coating material.

28. The use of the compounds of claim 17 of the formula Ia as a stabilizer for organic materials, in particular for organic polymers.

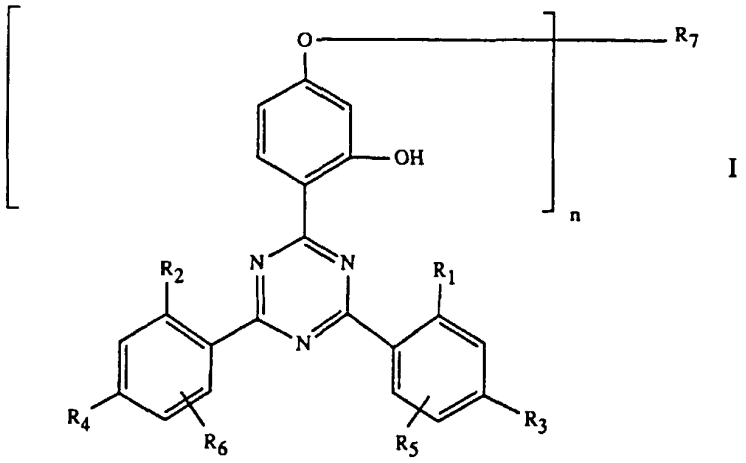
29. Use according to claim 28 as a stabilizer for polycarbonates.

30. The use of the compounds of claim 17 of the formula Ia as stabilizer for radiation-curable coating material.

Claims for the following Contracting State : ES

1. An organic material which has been stabilized against damage caused by light, heat and oxygen and which contains

(a) 0.01 to 5 % by weight of at least one sterically hindered amine of the polyalkylpiperidine type and
(b) 0.02 to 5 % by weight of at least one o-hydroxyphenyl-s-triazine, wherein the triazine compound (b) is a compound of the formula I

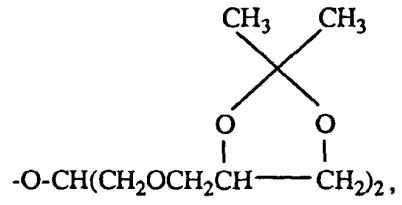


I

in which n is 1 to 4,

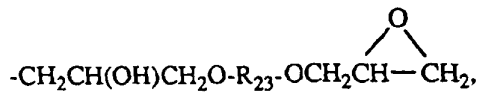
R_1 and R_2 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl or trifluoromethyl,
R_3 and R_4 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl, C_1-C_{18}-alkoxy or halogen and, in the event that n = 1, can also be a radical -OR_7,
R_5 and R_6 independently of one another are H, C_1-C_{12}alkyl,or halogen,
R_7, if n is 1, is

a) C_1-C_{18}alkyl which is substituted by one or more of the groups OH, C_1-C_{18}alkoxy, C_3-C_{18}alkenoxy, halogen, phenoxy (which is unsubstituted or substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen), furyloxy,



-COOH, -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, -NHR_9, -$N(R_9)(R_{10})$, -$NHCOR_{11}$, -CN and/or by -O-CO-R_{11},

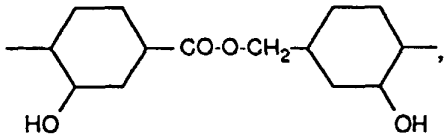
b) C_4-C_{50}alkyl which is interrupted by one or more O and can be substituted by OH or/and glycidyloxy,
c) C_3-C_6alkenyl,
d) glycidyl or a group



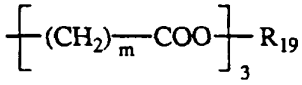
e) cyclohexyl which is unsubstituted or substituted by OH or -$OCOR_{11}$,
f) C_7-C_{11}phenylalkyl which is unsubstituted or substituted by OH Cl or CH_3,
g) -CO-R_{12} or
h) -SO_2-R_{13},

and if n is 2, R_7 is

a) C_2-C_{16}alkylene,
b) C_4-C_{12}alkenylene,
c) xylylene,
d) C_3-C_{20}alkylene which is interrupted by one or more O and/or substituted by OH,
e) a group -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CO-NH-R_{17}-NH-CO- or -$(CH_2)_m$-COO-R_{18}-OOC-$(CH_2)_m$- (in which m is 1 to 3) or

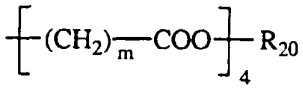


and if n is 3, R_7 is a group



m = 1-3,

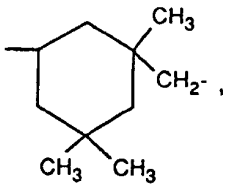
and if n is 4, R_7 is a group



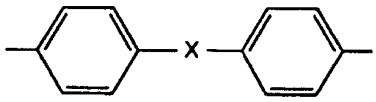
m = 1-3,

R_8 is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by one or more O, N or S and/or substituted by OH, C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$, -$N(R_9)(R_{10})$ or -$OCOR_{11}$ and/or OH, C_3-C_{18}alkenyl, glycidyl or C_7-C_{11}phenylalkyl,
R_9 and R_{10} independently of one another are C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or R_9 and R_{10} together are C_3-C_9alkylene or C_3-C_9oxaalkylene or C_3-C_9azaalkylene,
R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,
R_{12} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl, phenyl, C_1-C_{12}alkoxy, phenoxy, C_1-C_{12}alkylamino or C_6-C_{12}arylamino or a group -R_{24}-COOH or -NH-R_{17}-NCO,
R_{13} is C_1-C_{12}alkyl, C_6-C_{12}aryl or C_7-C_{14}alkaryl,

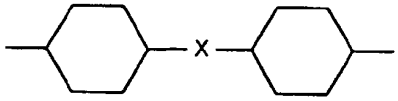
R_{14} is C_1-C_{12}alkyl or phenyl,
R_{15} is C_2-C_{10}alkylene, C_4-C_{50}alkylene which is interrupted by one or more O, phenylene or a group -phenylene-X-phenylene- in which X is -O-, -S-, $-SO_2-$, $-CH_2-$ or $-C(CH_3)_2-$,
R_{16} is C_2-C_{10}alkylene, C_2-C_{10}oxaalkylene or C_2-C_{10}thiaalkylene, C_6-C_{12}arylene or C_2-C_6alkenylene,
R_{17} is C_2-C_{10}alkylene, phenylene, tolylene, diphenylenemethane or a group



R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by one or more O,
R_{19} is C_3-C_{12}alkanetriyl,
R_{20} is C_4-C_{12}alkanetetryl,
R_{23} is $C_{2\text{-}C10}$alkylene, phenylene or a group



or

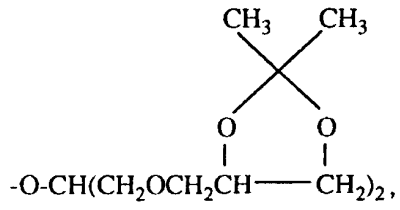


wherein X is O, S, SO_2, CH_2 or $C(CH_3)_2$, and
R_{24} is C_2-C_{14}alkylene, vinylene or o-phenylene.

2. An organic material according to claim 1, wherein the triazine compound (b) is a compound of the formula I in which n is 1, 2 or 4, R_1 and R_2 independently of one another are H or CH_3, R_3 and R_4 independently of one another are H, CH_3 or Cl, R_5 and R_6 are hydrogen,

R_7, if n is 1, is

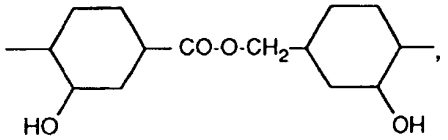
a) C_1-C_{14}alkyl which is substituted by one or more of the groups OH, C_1-C_{15}alkoxy, allyloxy, phenoxy, furyloxy,



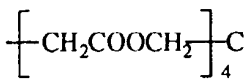
-$COOR_8$, -$CON(R_9)(R_{10})$ and/or by -$OCOR_{11}$,
b) C_6-C_{45}alkyl which is interrupted by one or more O and can be substituted by OH or/and glycidyloxy,

c) glycidyl or
d) hydroxycyclohexyl,

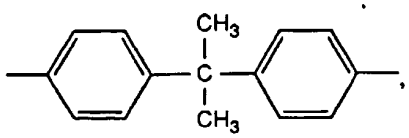
and if n is 2, R_7 is C_6-C_{12}alkenylene, 2-butenylene-1,4, xylylene, C_3-C_{20}alkylene which is interrupted by one or more O or substitutcd by OH, or R_7 is a group $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CO-R_{16}-CO-$, $-CH_2-COO-R_{18}-OOC-CH_2-$or



and if n is 4, R_7 is

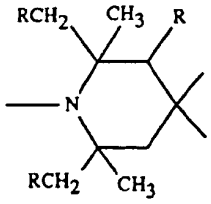


R_8 is C_4-C_{10}alkyl, oleyl, C_3-C_{20}alkyl which is interrupted by one or more O and/or substituted by OH, or R_8 is $-CH_2P(O)(OR_{14})_2$,
R_9 and R_{10} are C_2-C_6alkyl
R_{11} is C_6-C_{10}alkyl, C_2-C_3alkenyl
R_{14} is C_1-C_4alkyl,
R_{15} is C_2-C_8alkylene, C_{10}-C_{45}alkylene which is interrupted by more than one 0, or is a group



R_{16} is C_4-C_8alkylene and R_{18} is C_4-C_8alkylene.

3. An organic material according to claim 1, wherein the component (a) is a compound containing at least one group of the formula



in which R is hydrogen or methyl, preferably wherein R is hydrogen.

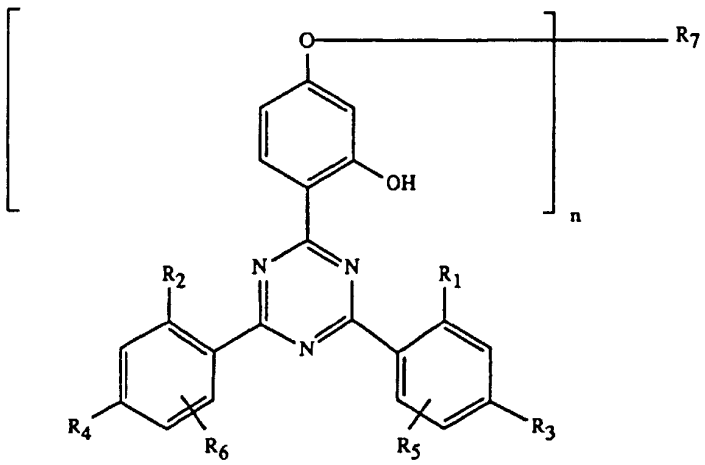
4. An organic material according to claim 1, wherein the material is an organic polymer.

5. An organic polymer according to claim 4, wherein the polymer is a coating binder.

6. An organic material according to claim 1, wherein the material is a radiation-curable coating material.

7. A radiation-curable coating material containing a hydroxyphenyltriazin of formula I as defined in claim 1 in the absence of a sterically hindered amine.

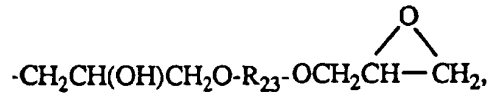
8. An organic material which has been stabilized against damage caused by light, heat and oxygen containing 0.01 to 10 % by weight of at least one compound of the formula Ia



in which n is 1 to 4,

R_1 and R_2 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl or trifluoromethyl,
R_3 and R_4 independently of one another are H, OH, C_1-C_{12}alkyl, cyclohexyl, C_1-C_{18}alkoxy or halogen and, in the event that n = 1, can also be a radical -OR_7,
R_5 and R_6 independently of one another are H, C_1-C_{12}alkyl or halogen,
R_7, if n is 1, is

a) C_1-C_{12}alkyl which is substituted by phenoxy (which is unsubstituted or substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen) or by a group -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, NHR_9, -$N(R_9)(R_{10})$ or -O-CO-R_{22},
b) C_4-C_{50}alkyl which is interrupted by more than one O and can be substituted by OH or/and glycidyloxy,
c) glycidyl or a group

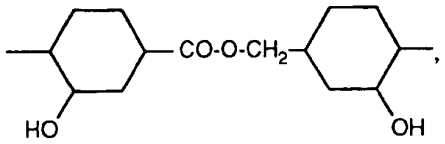


d) cyclohexyl substituted by OH or -$OCOR_{11}$
e) a group -$CH_2CH(OH)CH_2OR_{21}$
f) a group -SO_2-R_{13},
g) a group -CO-R_{12}

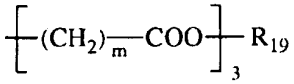
and if n is 2, R_7 is

a) C_2-C_{12}alkylene,
b) C_4-C_{12}alkenylene,
c) xylylene,

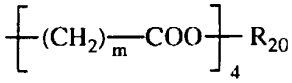
d) C_3-C_{20}alkylene which is interrupted by one or more 0 and/or substituted by OH,
e) a group $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (wherein m is 1-3) or



and if n is 3, R_7 is a group

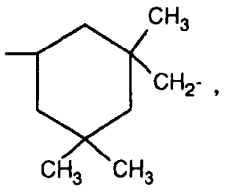


(wherein m is 1-3), and if n is 4, R_7 is a group

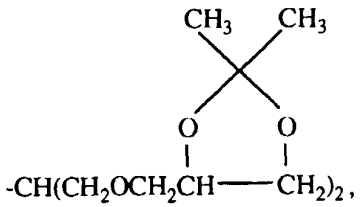


(wherein m is 1-3),

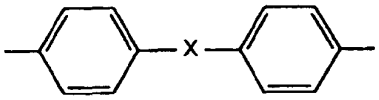
R_8 is C_3-C_{20}alkyl which is interrupted by one or more O, N or S and can be substituted by OH, or R_8 is C_1-C_4alkyl which is substituted by $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$, or $-OCOR_{11}$, or R_8 is C_3-C_{18}alkenyl, glycidyl or C_7-C_{11}phenylalkyl,
R_9 and R_{10} independently are C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or R_9 and R_{10} together are C_3-C_9alkylene or C_3-C_9-oxaalkylene or C_3-C_9azaalkylene,
R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,
R_{12} is a group $-R_{24}-COOH$ or $-NH-R_{17}-NCO$,
R_{13} is C_1-C_{12}alkyl, C_6-C_{12}aryl or C_7-C_{14}alkaryl
R_{14} is C_1-C_{12}alkyl or phenyl
R_{15} is C_2-C_{10}alkylene, C_4-C_{50}alkylene which is interrupted by one or more 0, or R_{15} is phenylene or a group -phenylene-X-phenylene in which X is -O-, -S-, $-SO_2-$, $-CH_2-$ or $-C(CH_3)_2-$,
R_{17} is C_2-C_{10}alkylene, phenylene, tolylene, diphenylenemethane or a group



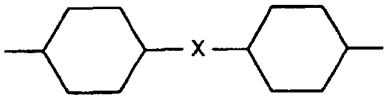
R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by one or more O,
R_{19} is C_3-C_{12}alkanetriyl,
R_{20} is C_4-C_{12}alkanetetryl,
R_{21} is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, phenyl, phenyl substituted by C_1-C_{12}alkyl, C_1-C_{12}alkoxy or halogen, or R_{21} is C_2-C_{19}alkanoyl, benzoyl, C_3-C_{18}alkenoyl, furyl or a group



R_{22} is C_2-C_5alkenyl,
R_{23} is C_2-C_{10}alkylene, phenylene or a group



or



wherein X is O, S, SO_2, CH_2 or $C(CH_3)_2$, and
R_{24} is C_2-C_{14}alkylene, vinylene or o-phenylene.

9. An organic polymer as a material according to claim 8.

10. A polycarbonate according to claim 9.

11. An organic material according to claim 8 which is a radiation-curable coating material.

12. The use of the compounds of claim 8 of the formula Ia as a stabilizer for organic materials, in particular for organic polymers.

13. Use according to claim 12 as a stabilizer for polycarbonates.

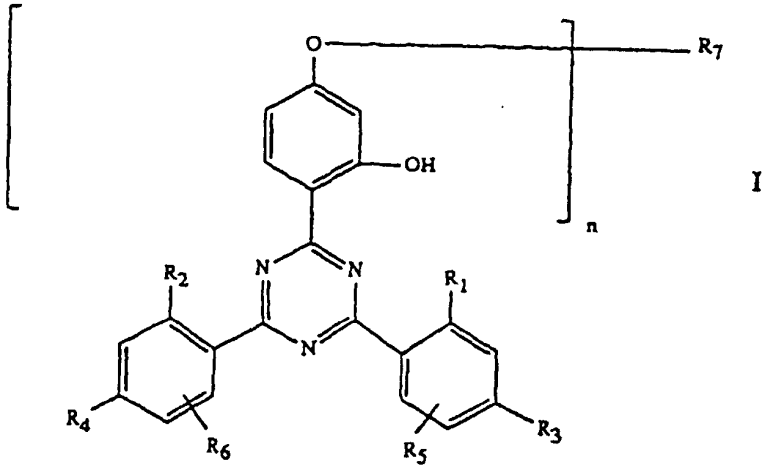
14. The use of the compounds of claim 8 of the formula Ia as stabilizer for radiation-curable coating material.

Patentansprüche

Patentansprüche für folgende Vertragsstaaten : AT, BE, CH, DE, FR, GB, IT, LI, NL

1. Organisches Material, das gegen durch Licht, Wärme und Sauerstoff verursachte Schädigung stabilisiert wurde und das enthält

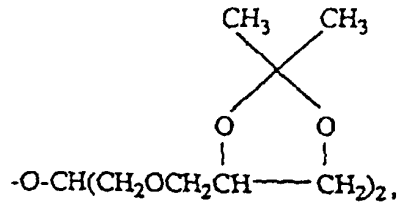
   (a) mindestens ein sterisch gehindertes Amin vom Polyalkylpiperidintyp und
   (b) mindestens ein o-Hydroxyphenyl-s-triazin, worin die Triazinverbindung (b) eine Verbindung der Formel I



I

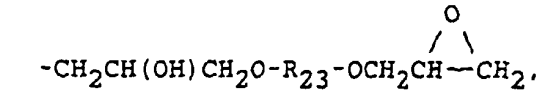
darstellt, worin n 1 bis 4 ist,

R_1 und R_2 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl oder Trifluormethyl darstellen,
R_3 und R_4 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl, C_1-C_{18}-Alkoxy oder Halogen darstellen und wenn n = 1, ebenfalls den Rest $-OR_7$ bedeuten können,
R_5 und R_6 unabhängig voneinander H, C_1-C_{12}-Alkyl oder Halogen darstellen,
R_7, wenn n 1 ist, a) C_1-C_{18}-Alkyl, das mit einer oder mehreren Gruppen OH, C_1-C_{18}-Alkoxy, C_3-C_{18}-Alkenoxy, Halogen, Phenoxy (das unsubstituiert oder mit C_1-C_{18}-Alkyl, C_1-C_{18}-Alkoxy oder Halogen substituiert ist), Furyloxy,



-COOH, $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$, $-N(R_9)(R_{10})$, $-NHCOR_{11}$, -CN und/oder mit $-O-CO-R_{11}$ substituiert ist,

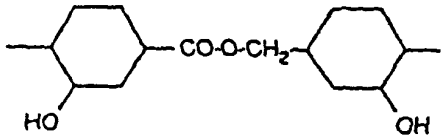
b) C_4-C_{50}-Alkyl, das durch ein oder mehrere Atome O unterbrochen ist und mit OH oder/und Glycidyloxy substituiert sein kann,
c) C_3-C_6-Alkenyl,
d) Glycidyl oder eine Gruppe



e) Cyclohexyl, das unsubstituiert oder mit OH oder $-OCOR_{11}$ substituiert ist,
f) C_7-C_{11}-Phenylalkyl, das unsubstituiert oder mit OH, Cl oder CH_3 substituiert ist,
g) $-CO-R_{12}$ oder
h) $-SO_2-R_{13}$ darstellt,

und wenn n 2 ist,
R_7

a) C_2-C_{16}-Alkylen,
b) C_4-C_{12}-Alkenylen,
c) Xylylen,
d) C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist,
e) eine Gruppe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CO-R_{16}-CO-$, $-CO-NH-R_{17}-NH-CO-$ oder $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (worin m 1 bis 3 ist) oder



darstellt, und wenn n 3 ist, R_7 eine Gruppe

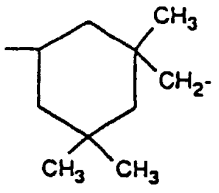
$$\{(CH_2)_m-COO\}_3-R_{19} \qquad m=1\text{-}3,$$

darstellt,
und wenn n 4 ist, R_7 eine Gruppe

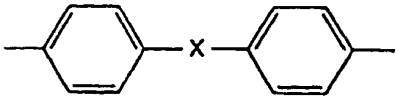
$$\{(CH_2)_m-COO\}_4-R_{20} \qquad m=1\text{-}3,$$

darstellt,

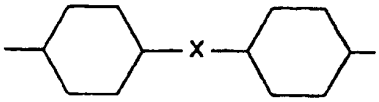
R_8 C_1-C_{18}-Alkyl, C_3-C_{18}-Alkenyl, C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O, N oder S unterbrochen und/oder mit OH substituiert ist, C_1-C_4-Alkyl, das substituiert ist mit $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ oder $-OCOR_{11}$ und/oder OH, C_3-C_{18}-Alkenyl, Glycidyl oder C_7-C_{11}-Phenylalkyl,
R_9 und R_{10} unabhängig voneinander C_1-C_{12}-Alkyl, C_3-C_{12}-Alkoxyalkyl, C_4-C_{16}-Dialkylaminoalkyl oder C_5-C_{12}-Cycloalkyl darstellen oder R_9 und R_{10} zusammen C_3-C_9-Alkylen oder C_3-C_9-Oxaalkylen oder C_3-C_9-Azaalkylen darstellen,
R_{11} C_1-C_{18}-Alkyl, C_2-C_{18}-Alkenyl oder Phenyl darstellt,
R_{12} C_1-C_{18}-Alkyl, C_2-C_{18}-Alkenyl, Phenyl, C_1-C_{12}-Alkoxy, Phenoxy, C_1-C_{12}-Alkylamino oder C_6-C_{12}-Arylamino oder eine Gruppe $-R_{24}-COOH$ oder $-NH-R_{17}-NCO$ darstellt,
R_{13} C_1-C_{12}-Alkyl, C_6-C_{12}-Aryl oder C_7-C_{14}-Alkaryl darstellt,
R_{14} C_1-C_{12}-Alkyl oder Phenyl darstellt,
R_{15} C_2-C_{10}-Alkylen, C_4-C_{50}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, Phenylen oder eine Gruppe -Phenylen-X-Phenylen-, worin X -O-, -S-, $-SO_2-$, $-CH_2-$ oder $-C(CH_3)_2-$ bedeutet, darstellt,
R_{16} C_2-C_{10}-Alkylen, C_2-C_{10}-Oxaalkylen oder C_2-C_{10}-Thiaalkylen, C_6-C_{12}-Arylen oder C_2-C_6-Alkenylen darstellt,
R_{17} C_2-C_{10}-Alkylen, Phenylen, Tolylen, Diphenylenmethan oder eine Gruppe



darstellt,
R_{18} C_2-C_{10}-Alkylen oder C_4-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt,
R_{19} C_3-C_{12}-Alkantriyl darstellt,
R_{20} C_4-C_{12}-Alkantetryl darstellt,
R_{23} C_2-C_{10}-Alkylen, Phenylen oder eine Gruppe



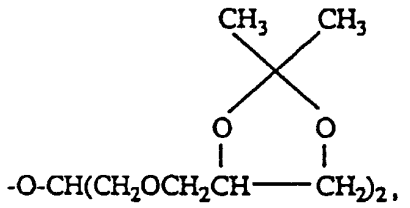
oder



darstellt,
worin X O, S, SO_2, CH_2 oder $C(CH_3)_2$ darstellt und
R_{24} C_2-C_{14}-Alkylen, Vinylen oder o-Phenylen darstellt.

2. Organisches Material nach Anspruch 1, worin die Triazinverbindung (b) eine Verbindung der Formel I darstellt, worin n 1 bis 4 ist, R_1 und R_2 unabhängig voneinander H, OH oder C_1-C_4-Alkyl darstellen, R_3 und R_4 unabhängig voneinander H, OH, C_1-C_4-Alkyl, C_1-C_4-Alkoxy, Halogen oder einen Rest $-OR_7$ darstellen, R_5 und R_6 unabhängig voneinander H oder C_1- C_4-Alkyl darstellen,

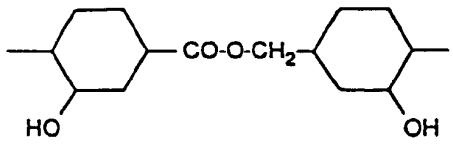
R_7, wenn n 1 ist, a) C_1-C_{18}-Alkyl, das mit einer oder mehreren Gruppen OH, C_1-C_{18}-Alkoxy, Allyloxy, Phenoxy, Furyloxy,



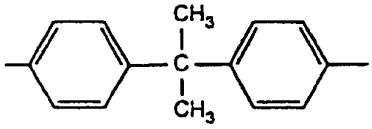
$-COOR_8$, $-CON(R_9)(R_{10})$ und/oder mit $-OCOR_{11}$ substituiert ist, darstellt,

b) C_4-C_{50}-Alkyl, das durch ein oder mehrere Atome O unterbrochen ist und mit OH oder/und Glycidyloxy substituiert sein kann,
c) Allyl, Glycidyl oder Benzyl,
d) Cyclohexyl oder Hydroxycyclohexyl,

und wenn n 2 ist, R_7 C_4-C_{12}-Alkylen, C_4-C_6-Alkenylen, Xylylen, C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist, oder R_7 eine Gruppe $-CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, $-CH_2$-COO-R_{18}-OOC-CH_2- oder



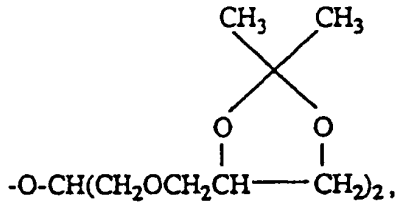
darstellt,
und wenn n 3 ist, R_7 eine Gruppe $\{CH_2COOCH_2\}_3$-C-C_2H_5
darstellt,
und wenn n 4 ist, R_7 eine Gruppe
$\{CH_2COOCH_2\}_3$-C darstellt,
R_8 C_1-C_{12}-Alkyl, C_3-C_{18}-Alkenyl, C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist, darstellt oder R_8 C_1-C_4-Alkyl, das mit -P(O)$(OR_{14})_2$ substituiert ist, darstellt, R_9 und R_{10} C_1-C_6-Alkyl darstellen oder R_9 und R_{10} zusammen Pentamethylen oder 3-Oxapentamethylen darstellen,
R_{11} C_1-C_{12}-Alkyl, C_2-C_5-Alkenyl oder Phenyl darstellt,
R_{14} C_1-C_{12}-Alkyl darstellt,
R_{15} C_2-C_8-Alkylen, C_4-C_{50}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist oder eine Gruppe



bedeutet, darstellt,
R_{16} C_2-C_8-Alkylen, C_2-C_6-Oxaalkylen oder C_2-C_6-Thiaalkylen darstellt und R_{18} C_4-C_8-Alkylen oder C_4-C_{12}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt.

3. Organisches Material nach Anspruch 1, worin die Triazinverbindung (b) eine Verbindung der Formel I darstellt, worin n 1, 2 oder 4 ist, R_1 und R_2 unabhängig voneinander H oder CH_3 darstellen, R_3 und R_4 unabhängig voneinander H, CH_3 oder Cl darstellen, R_5 und R_6 Wasserstoff darstellen,

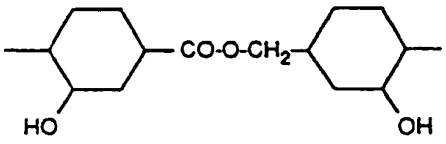
R_7, wenn n 1 ist, a) C_1-C_{14}-Alkyl, das mit ein oder mehreren der Gruppen OH, C_1-C_{15}-Alkoxy, Allyloxy, Phenoxy, Furyloxy,



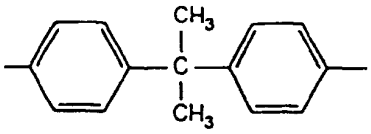
-$COOR_8$, -$CON(R_9)(R_{10})$ und/oder mit -$OCOR_{11}$ substituiert ist,

b) C_6-C_{45}-Alkyl, das durch ein oder mehrere Atome O unterbrochen ist und mit OH oder/und Glycidyloxy substituiert sein kann,
c) Glycidyl oder
d) Hydroxycyclohexyl darstellt,

und wenn n 2 ist, R_7 C_6-C_{12}-Alkylen, 2-Butenylen-1,4, Xylylen, C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen oder mit OH substituiert ist, darstellt, oder R_7 eine Gruppe -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CH_2-COO-R_{18}-OOC-CH_2- oder



darstellt,
und wenn n 4 ist, R_7 $[CH_2COOCH_2]_4$-C darstellt,
R_8 C_4-C_{10}-Alkyl, Oleyl, C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist, darstellt, oder R_8 $-CH_2P(O)(OR_{14})_2$ darstellt,
R_9 und R_{10} C_2-C_6-Alkyl darstellen,
R_{11} C_6-C_{10}-Alkyl, C_2-C_3-Alkenyl darstellt,
R_{14} C_1-C_{12}-Alkyl darstellt,
R_{15} C_2-C_8-Alkylen, C_{10}-C_{45}-Alkylen, das durch mehr als ein Atom O unterbrochen ist oder eine Gruppe

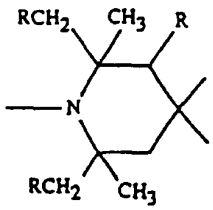


bedeutet, darstellt,
R_{16} C_4-C_8-Alkylen darstellt und R_{18} C_4-C_8-Alkylen darstellt.

4. Organisches Material nach Anspruch 1, worin die Komponente (b) eine Verbindung der Formel I darstellt, worin n 1 oder 2 ist und, wenn n 1 ist, R_7 eine Gruppe $-CH_2CH(OH)CH_2-OR_{21}$ darstellt, worin R_{21} C_1-C_{18}-Alkyl, Allyl, Phenyl, Furyl, C_6-C_{12}-Alkanoyl oder C_3-C_5-Alkenoyl darstellt, und wenn n 2 ist, R_7 eine Gruppe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$ darstellt, worin R_{15} wie in Anspruch 1 definiert ist.

5. Organisches Material nach Anspruch 1, worin die Komponente (b) eine Verbindung der Formel I darstellt, worin R_1 und R_2 Wasserstoff oder Methyl darstellen, R_3 und R_4 Wasserstoff, Chlor oder Methyl darstellen und R_5 und R_6 Wasserstoff darstellen.

6. Organisches Material nach Anspruch 1, worin die Komponente (a) eine Verbindung, enthaltend mindestens eine Gruppe der Formel



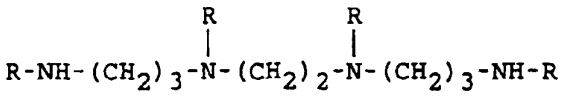
worin R Wasserstoff oder Methyl bedeutet, darstellt.

7. Organisches Material nach Anspruch 6, worin R Wasserstoff darstellt.

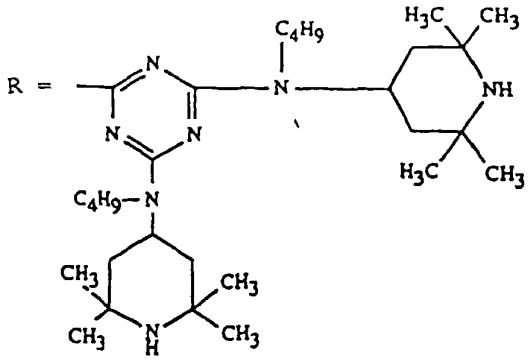
8. Organisches Material nach Anspruch 6, worin die Komponente (a) eine der nachstehenden Verbindungen darstellt:

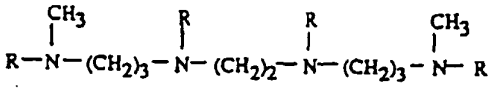
Di-(2,2,6,6-tetramethylpiperidin-4-yl)succinat,
Di-(2,2,6,6-tetramethylpiperidin-4-yl)sebacat,
Di-(1,2,2,6,6-pentamethylpiperidin-4-yl)sebacat,
Di-(1,2,2,6,6-pentamethylpiperidin-4-yl)butyl-(3,5-di-tert-butyl-4-hydroxybenzyl)malonat,

Di-(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)sebacat,
Tetra-(2,2,6,6-tetramethylpiperidin-4-yl)butan-1,2,3,4-tetracarboxylat,
Tetra-(1,2,2,6,6-pentamethylpiperidin-4-yl)butan-1,2,3,4-tetracarboxylat,
N-(2,2,6,6-Tetramethylpiperidin-4-yl)-β-aminopropionsäuredodecylester,
N-(1-Octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)-N'-dodecyloxalamid,
N-(2,2,6,6-Tetramethylpiperidin-4-yl)-α-dodecylsuccinimid,
2,2,4,4-Tetramethyl-7-oxa-3,20-diaza-21-oxodispiro[5.1.11.2]heneicosan,
8-Acetyl-3-dodecyl-1,3,8-triaza-7,7,9,9-tetramethylspiro[4.5]decan-2,4-dion,
20-(Dodecyloxycarbonylethyl)-2,2,4,4-tetramethyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]heneicosan
oder eine Verbindung der Formeln

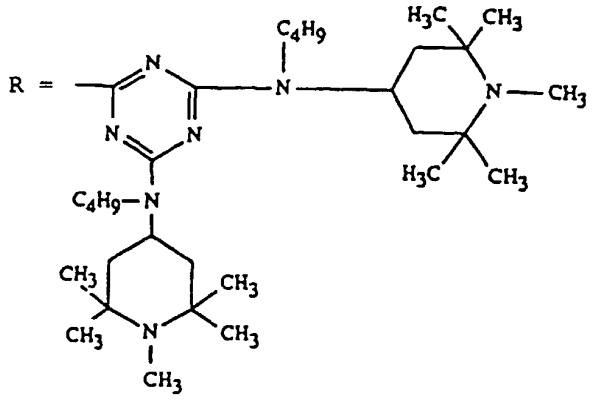


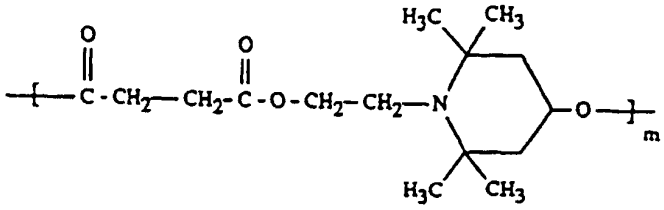
worin

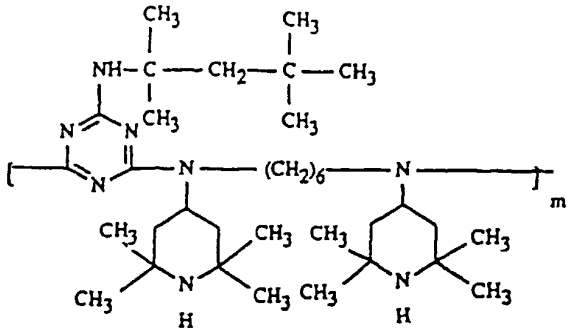


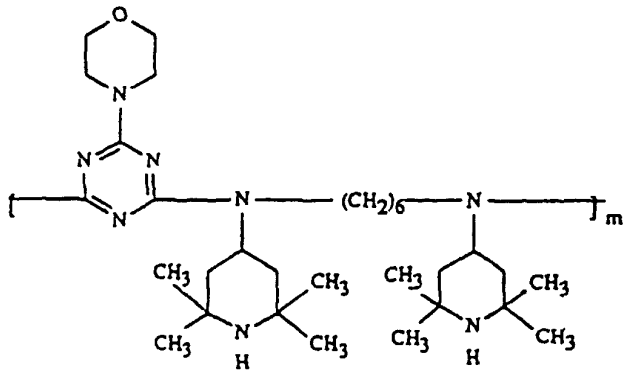


worin









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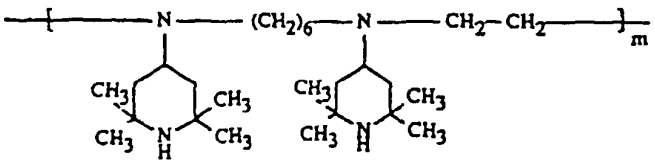


9. Organisches Material nach Anspruch 1, das 0,01 bis 5 Gew.-% der Komponente (a) und 0,02 bis 5 Gew.-% der Komponente (b), bezogen auf das Material, enthält.

10. Organisches Material nach Anspruch 9, das 0,02 bis 2 Gew.-% der Komponente (a) und 0,05 bis 3 Gew.-% der Komponente (b) enthält.

11. Organisches Material nach Anspruch 1, worin das Material ein organisches Polymer darstellt.

12. Organisches Polymer nach Anspruch 11, das zusätzlich zu den Komponenten (a) und (b) ebenfalls weiterhin Stabilisatoren, Füllstoffe, Verstärkungsmittel, Pigmente, Farbstoffe, Weichmacher, Lösungsmittel, Gleitmittel, Fließsteuerungsmittel, Fluoreszenzaufheller, Kernbildungsmittel, antistatische Mittel oder Flammverzögerungsmittel enthält.

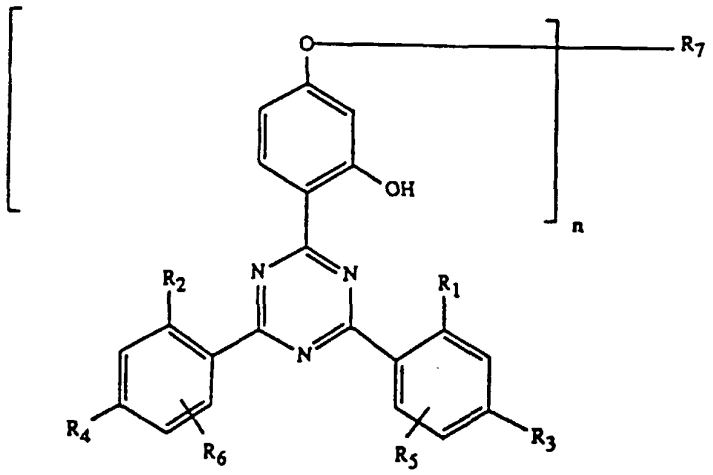
13. Organisches Polymer nach Anspruch 11, worin das Polymer ein Beschichtungsbindemittel darstellt.

14. Organisches Material nach Anspruch 1, worin das Material ein strahlungshärtbares Beschichtungsmaterial darstellt.

15. Strahlungshärtbares Beschichtungsmaterial, enthaltend ein Hydroxyphenyltriazin der Formel I, wie in Anspruch 1 definiert, in Abwesenheit eines sterisch gehinderten Amins.

16. Verfahren zur Stabilisierung organischen Materials gegen durch Licht, Wärme und Sauerstoff verursachte Schädigung durch Zugabe der wie in Anspruch 1 definierten Komponenten (a) und (b).

17. Verbindung der Formel Ia

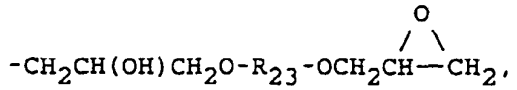


Ia

worin n 1 bis 4 ist,

R_1 und R_2 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl oder Trifluormethyl darstellen,
R_3 und R_4 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl, C_1-C_{18}-Alkoxy oder Halogen darstellen und im Fall, daß n = 1, ebenfalls einen Rest $-OR_7$ darstellen können,
R_5 und R_6 unabhängig voneinander H, C_1-C_{12}-Alkyl oder Halogen darstellen,
R_7, wenn n 1 ist,

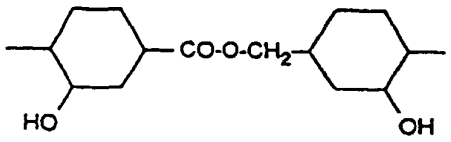
a) C_1-C_{12}-Alkyl, das mit Phenoxy, (das unsubstituiert oder mit C_1-C_{18}-Alkyl, C_1-C_{18}-Alkoxy oder Halogen substituiert ist) oder mit einer Gruppe $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$, $-N(R_9)(R_{10})$ oder $-O-CO-R_{22}$ substituiert ist,
b) C_4-C_{50}-Alkyl, das durch mehr als ein Atom O unterbrochen ist und mit OH oder/und Glycidyloxy substituiert sein kann,
c) Glycidyl oder eine Gruppe



d) Cyclohexyl, substituiert mit OH oder $-OCOR_{11}$,
e) eine Gruppe $-CH_2CH(OH)CH_2OR_{21}$,
f) eine Gruppe $-SO_2-R_{13}$,
g) eine Gruppe $-CO-R_{12}$ darstellt, und

wenn n 2 ist, R_7

a) C_2-C_{12}-Alkylen,
b) C_4-C_{12}-Alkenylen,
c) Xylylen,
d) C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist,
e) eine Gruppe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (worin m 1 bis 3 ist) oder



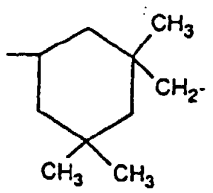
darstellt,
und wenn n 3 ist, R_7 eine Gruppe

$$\{(CH_2)_m\text{-}COO\}_3\text{-}R_{19} \qquad \text{(worin m 1-3 ist),}$$

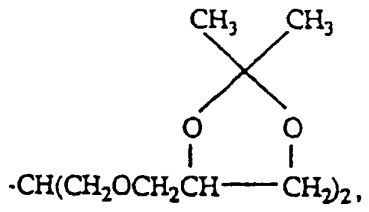
darstellt,
und wenn n 4 ist, R_7 eine Gruppe

$$\{(CH_2)_m\text{-}COO\}_4\text{-}R_{20} \text{ (worin m 1-3 ist),}$$

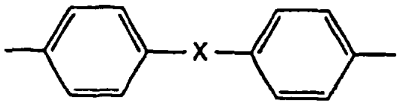
darstellt,
R_8 C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O, N oder S unterbrochen ist und mit OH substituiert sein kann, darstellt oder R_8 C_1-C_4-Alkyl, das mit -P(O)$(OR_{14})_2$, -N$(R_9)(R_{10})$ oder -OCOR_{11} substituiert ist, darstellt oder R_8 C_3-C_{18}-Alkenyl, Glycidyl oder C_7-C_{11}-Phenylalkyl darstellt,
R_9 und R_{10} unabhängig voneinander C_1-C_{12}-Alkyl, C_3-C_{12}-Alkoxyalkyl, C_4-C_{16}-Dialkylaminoalkyl oder C_5-C_{12}-Cycloalkyl darstellen oder R_9 und R_{10} zusammen C_3-C_9-Alkylen oder C_3-C_9-Oxaalkylen oder C_3-C_9-Azaalkylen darstellen,
R_{11} C_1-C_{18}-Alkyl, C_2-C_{18}-Alkenyl oder Phenyl darstellt,
R_{12} eine Gruppe -R_{24}-COOH oder -NH-R_{17}-NCO darstellt,
R_{13} C_1-C_{12}-Alkyl, C_6-C_{12}-Aryl oder C_7-C_{14}-Alkaryl darstellt,
R_{14} C_1-C_{12}-Alkyl oder Phenyl darstellt,
R_{15} C_2-C_{10}-Alkylen, C_4-C_{50}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt oder R_{15} Phenylen oder eine Gruppe -Phenylen-X-Phenylen- darstellt, worin X -O-, -S-, -SO_2-, -CH_2- oder -$C(CH_3)_2$- darstellt,
R_{17} C_2-C_{10}-Alkylen, Phenylen, Tolylen, Diphenylenmethan oder eine Gruppe



darstellt,
R_{18} C_2-C_{10}-Alkylen oder C_4-C_{20}-Alkylen darstellt, das durch ein oder mehrere Atome O unterbrochen ist,
R_{19} C_3-C_{12}-Alkantriyl darstellt,
R_{20} C_4-C_{12}-Alkantetryl darstellt,
R_{21} C_1-C_{18}-Alkyl, C_3-C_{18}-Alkenyl, Phenyl, Phenyl, das mit C_1-C_{12}-Alkyl, C_1-C_{12}-Alkoxy oder Halogen substituiert ist, darstellt, oder R_{21} C_2-C_{19}-Alkanoyl, Benzoyl, C_3-C_{18}-Alkenoyl, Furyl oder eine Gruppe



darstellt,
R_{22} C_2-C_5-Alkenyl darstellt,
R_{23} C_2-C_{10}-Alkylen, Phenylen oder eine Gruppe



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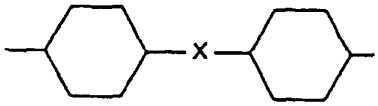


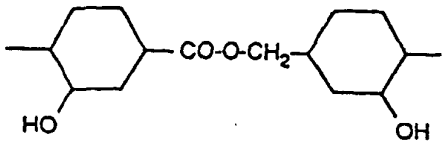
darstellt,
worin X O, S, SO_2, CH_2 oder $C(CH_3)_2$ darstellt und
R_{24} C_2-C_{14}-Alkylen, Vinylen oder o-Phenylen darstellt.

18. Verbindung der Formel Ia nach Anspruch 17, worin n 1 oder 2 ist,

R_1 und R_2 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl oder Halogenmethyl darstellen,
R_3 und R_4 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, C_1-C_{18}-Alkoxy oder Halogen darstellen und im Fall, daß n = 1, ebenfalls ein Rest $-OR_7$ sein können,
R_5 und R_6 unabhängig voneinander H, C_1-C_{12}-Alkyl oder Halogen darstellen,
R_7 C_1-C_{12}-Alkyl, das substituiert ist mit Phenoxy, das unsubstituiert oder mit C_1-C_{18}-Alkyl, C_1-C_{18}-Alkoxy oder Halogen substituiert ist, C_1-C_{12}-Alkyl, das mit $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$ oder $-N(R_9)(R_{10})$ substituiert ist, C_6-C_{20}-Alkyl, das durch mehr als ein Atom O unterbrochen ist und mit OH substituiert ist, Glycidyl, Cyclohexyl, substituiert mit OH oder $-OCOR_{11}$, eine Gruppe $-CH_2CH(OH)CH_2-OR_{21}$ oder $-SO_2R_{13}$ darstellt, wenn n 1 ist, und wenn n 2 ist, C_2-C_{12}-Alkylen, C_4-C_{12}-Alkenylen, Xylylen, C_3-C_{20}-Alkylen, das durch O unterbrochen und/oder mit OH substituiert ist, oder eine Gruppe $-CH_2CH(OH)CH_2-O-R_{15}-OCH_2CH(OH)CH_2-$ oder $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ darstellt, worin m 1-3 ist,
R_8 C_3-C_{20}-Alkyl, das durch O, N oder S unterbrochen und/oder mit OH substituiert ist, C_1-C_4-Alkyl, das mit $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ oder $-OCOR_{11}$ substituiert ist, C_3-C_{18}-Alkenyl, Glycidyl oder C_7-C_{11}-Phenylalkyl darstellt,
R_9 und R_{10} unabhängig voneinander C_1-C_{12}-Alkyl, C_3-C_{12}-Alkoxyalkyl, C_4-C_{16}-Dialkylaminoalkyl oder C_5-C_{12}-Cycloalkyl darstellen oder R_9 und R_{10} zusammen C_3-C_9-Alkylen oder C_3-C_9-Oxaalkylen oder C_3-C_9-Azaalkylen darstellen,
R_{11} C_1-C_{18}-Alkyl, C_2-C_{16}-Alkenyl oder Phenyl darstellt,
R_{13} C_1-C_{12}-Alkyl, C_6-C_{12}-Aryl oder C_7-C_{14}-Alkaryl darstellt,
R_{14} C_1-C_{12}-Alkyl oder Phenyl darstellt,
R_{15} C_2-C_{10}-Alkylen, Phenylen oder eine Gruppe -Phenylen-X-Phenylen-, worin X -O-, -S-, $-SO_2-$, $-CH_2-$ oder $-C(CH_3)_2$ bedeutet, darstellt,
R_{18} C_2-C_{10}-Alkylen oder C_4-C_{20}-Alkylen, das durch O unterbrochen ist, darstellt und
R_{21} C_1-C_{18}-Alkyl, Phenyl, Phenyl, das mit C_1-C_{12}-Alkyl, C_1-C_{12}-Alkoxy oder Halogen substituiert ist, C_2-C_{12}-

Alkanoyl, Benzoyl oder C_3-C_5-Alkenoyl darstellt.

19. Verbindung nach Anspruch 17 der Formel Ia, worin n 1 bis 4 ist, R_1 und R_2 unabhängig voneinander H, OH oder C_1-C_4-Alkyl darstellen, R_3 und R_4 unabhängig voneinander H, OH, C_1-C_4-Alkyl, C_1-C_4-Alkoxy, Halogen oder einen Rest $-OR_7$ darstellen, R_5 und R_6 unabhängig voneinander H oder C_1-C_4-Alkyl darstellen, R_7, wenn n 1 ist, C_1-C_6-Alkyl, das mit $-COOR_8$, $-COONHR_9$, $-CON(R_9)(R_{10})$ oder $-OCOR_{22}$ substituiert ist, darstellt oder R_7 Glycidyl, Hydroxycyclohexyl oder eine Gruppe $-CH_2CH(OH)CH_2-OR_{21}$ darstellt, und wenn n 2 ist, R_7 C_4-C_{12}-Alkylen, C_4-C_6-Alkenylen, Xylylen, C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist, oder R_7 eine Gruppe $-CH_2CH(OH)CH_2-O-R_{15}-OCH_2CH(OH)CH_2-$, $-CH_2-COO-R_{18}-OOCCH_2-$ oder

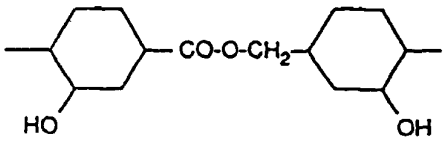


darstellt, und wenn n 3 ist,

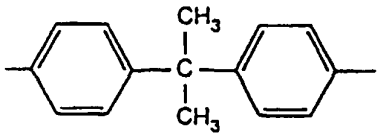
R_7 eine Gruppe $\{CH_2COOCH_2\}_3$-C-C_2H_5 darstellt und wenn n 4 ist, R_7 eine Gruppe $\{CH_2COOCH_2\}_4$-C darstellt,
R_8 C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O unterbrochen ist und mit OH substituiert sein kann, darstellt oder R_8 C_1-C_4-Alkyl, das durch $-P(O)(OR_{14})_2$ unterbrochen ist, darstellt oder R_8 C_3-C_{18}-Alkenyl darstellt,
R_9 und R_{10} unabhängig voneinander C_1-C_8-Alkyl oder Cyclohexyl darstellen oder R_9 und R_{10} zusammen Pentamethylen oder 3-Oxapentamethylen darstellen,
R_{14} C_1-C_{12}-Alkyl darstellt,
R_{15} C_2-C_8-Alkylen, C_4-C_{50}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt, oder R_{15} eine Gruppe -Phenylen-X-Phenylen- darstellt, worin X -O-, $-CH_2-$ oder $-C(CH_3)_2$ darstellt,
R_{18} C_4-C_8-Alkylen oder C_4-C_{12}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt,
R_{21} C_4-C_{18}-Alkyl, Allyl, Phenyl, Furyl, C_5-C_{19}-Alkanoyl oder C_3-C_5-Alkenoyl darstellt und R_{22} C_2-C_5-Alkenyl darstellt.

20. Verbindung nach Anspruch 17 der Formel Ia, worin n 1, 2 oder 4 ist, R_1 und R_2 unabhängig voneinander H oder CH_3 darstellen, R_3 und R_4 unabhängig voneinander H, CH_3 oder Cl darstellen, R_5 und R_6 Wasserstoff darstellen,

R_7, wenn n 1 ist, C_1-C_4-Alkyl, das mit $-COOR_8$, $-CON(R_9)(R_{10})$ oder $-O-COR_{22}$ substituiert ist, darstellt oder R_7 Glycidyl, 2-Hydroxycyclohexyl oder eine Gruppe $-CH_2CH(OH)CH_2OR_{21}$ darstellt,
und wenn n 2 ist, R_7 C_6-C_{12}-Alkylen, 2-Buten-1,4-ylen, Xylylen oder C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist, darstellt, oder R_7 eine Gruppe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CH_2-COO-R_{18}-OOCCH_2-$ oder



darstellt
und wenn n 4 ist, R_7 eine Gruppe $\{CH_2COOCH_2\}_4$-C darstellt,
R_8 C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O unterbrochen ist und mit OH substituiert sein kann, darstellt oder
R_8-$CH_2P(O)(OR_{14})_2$ oder Oleyl darstellt,
R_9 und R_{10} C_2-C_6-Alkyl darstellen,
R_{15} C_2-C_8-Alkylen, C_{10}-C_{45}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt, oder eine Gruppe



darstellt,
R_{18} C_4-C_8-Alkylen darstellt,
R_{21} C_4-C_{15}-Alkyl, Allyl, Phenyl, Furyl, C_5-C_{12}-Alkanoyl oder C_3-C_5-Alkenoyl darstellt und R_{22} C_2-C_3-Alkenyl darstellt.

21. Verbindung nach Anspruch 17 der Formel Ia, worin n 2 ist.

22. Verfahren zum Stabilisieren organischen Materials, insbesondere organische Polymere, gegen durch Licht, Wärme und Sauerstoff verursachte Schädigung durch die Zugabe eines o-Hydroxyphenyltriazins, umfassend Zugeben von mindestens einer Verbindung der Formel Ia nach Anspruch 17.

23. Organisches Material, enthaltend mindestens eine Verbindung der Formel Ia nach Anspruch 17, als Stabilisator gegen durch Licht, Wärme und Sauerstoff verursachte Schädigung.

24. Organisches Polymer als Material nach Anspruch 23.

25. Organisches Material nach Anspruch 23, enthaltend 0,01 bis 10 Gew.-% einer Verbindung der Formel Ia, bezogen auf das Material.

26. Polycarbonat nach Anspruch 24.

27. Organisches Material nach Anspruch 23, das ein strahlungshärtbares Beschichtungsmaterial darstellt.

28. Verwendung der Verbindungen nach Anspruch 17 der Formel Ia als Stabilisator für organische Materialien, insbesondere für organische Polymere.

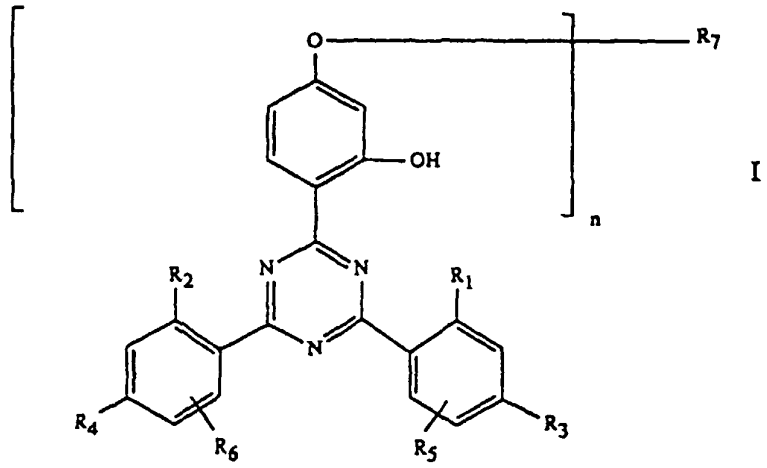
29. Verwendung nach Anspruch 28 als Stabilisator für Polycarbonate.

30. Verwendung der Verbindungen nach Anspruch 17 der Formel Ia als Stabilisator für strahlungshärtbares Beschichtungsmaterial.

Patentansprüche für folgenden Vertragsstaat : ES

1. Organisches Material, das gegen durch Licht, Wärme und Sauerstoff verursachte Schädigung stabilisiert wurde und das enthält

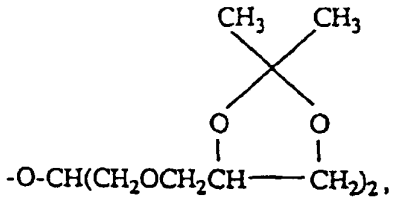
   (a) 0,01 bis 5 Gew.-% mindestens ein sterisch gehindertes Amin vom Polyalkylpiperidintyp und
   (b) 0,02 bis 5 Gew.-% mindestens ein o-Hydroxyphenyl-s-triazin, worin die Triazinverbindung (b) eine Verbindung der Formal I



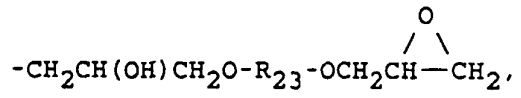
I

darstellt, worin n 1 bis 4 ist,

R_1 und R_2 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl oder Trifluormethyl darstellen,
R_3 und R_4 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl, C_1-C_{18}-Alkoxy oder Halogen darstellen und wenn n = 1, ebenfalls den Rest $-OR_7$ bedeuten können,
R_5 und R_6 unabhängig voneinander H, C_1-C_{12}-Alkyl oder Halogen darstellen,
R_7, wenn n 1 ist, a) C_1-C_{18}-Alkyl, das mit einer oder mehreren Gruppen OH, C_1-C_{18}-Alkoxy, C_3-C_{18}-Alkenoxy, Halogen, Phenoxy (das unsubstituiert oder mit C_1-C_{18}-Alkyl, C_1-C_{18}-Alkoxy oder Halogen substituiert ist), Furyloxy,



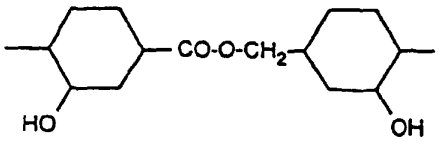
-COOH, $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$, $-N(R_9)(R_{10})$, $-NHCOR_{11}$, -CN und/oder mit $-O-CO-R_{11}$ substituiert ist,
b) C_4-C_{50}-Alkyl, das durch ein oder mehrere Atome O unterbrochen ist und mit OH oder/und Glycidyloxy substituiert sein kann,
c) C_3-C_6-Alkenyl,
d) Glycidyl oder eine Gruppe



e) Cyclohexyl, das unsubstituiert oder mit OH oder $-OCOR_{11}$ substituiert ist,
f) C_7-C_{11}-Phenylalkyl, das unsubstituiert oder mit OH, Cl oder CH_3 substituiert ist,
g) $-CO-R_{12}$ oder
h) $-SO_2-R_{13}$ darstellt,

und wenn n 2 ist, R_7

a) C_2-C_{16}-Alkylen,
b) C_4-C_{12}-Alkenylen,
c) Xylylen,
d) C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist,
e) eine Gruppe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CO-R_{16}-CO-$, $-CO-NH-R_{17}-NH-CO-$ oder $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (worin m 1 bis 3 ist) oder



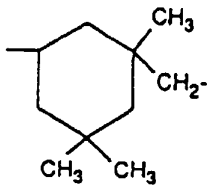
darstellt,
und wenn n 3 ist, R_7 eine Gruppe

$$\{(CH_2)_m\text{-}COO\}_3\text{-}R_{19} \qquad m=1\text{-}3,$$

darstellt,
und wenn n 4 ist, R_7 eine Gruppe

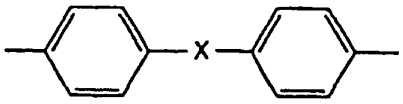
$$\{(CH_2)_m\text{-}COO\}_4\text{-}R_{20} \qquad m=1\text{-}3,$$

darstellt,
R_8 C_1-C_{18}-Alkyl, C_3-C_{18}-Alkenyl, C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O, N oder S unterbrochen und/oder mit OH substituiert ist, C_1-C_4-Alkyl, das substituiert ist mit $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ oder $-OCOR_{11}$ und/oder OH, C_3-C_{18}-Alkenyl, Glycidyl oder C_7-C_{11}-Phenylalkyl,
R_9 und R_{10} unabhängig voneinander C_1-C_{12}-Alkyl, C_3-C_{12}-Alkoxyalkyl, C_4-C_{16}-Dialkylaminoalkyl oder C_5-C_{12}-Cycloalkyl darstellen oder R_9 und R_{10} zusammen C_3-C_9-Alkylen oder C_3-C_9-Oxaalkylen oder C_3-C_9-Azaalkylen darstellen,
R_{11} C_1-C_{18}-Alkyl, C_2-C_{18}-Alkenyl oder Phenyl darstellt,
R_{12} C_1-C_{18}-Alkyl, C_2-C_{18}-Alkenyl, Phenyl, C_1-C_{12}-Alkoxy, Phenoxy, C_1-C_{12}-Alkylamino oder C_6-C_{12}-Arylamino oder eine Gruppe $-R_{24}$-COOH oder $-NH-R_{17}$-NCO darstellt,
R_{13} C_1-C_{12}-Alkyl, C_6-C_{12}-Aryl oder C_7-C_{14}-Alkaryl darstellt,
R_{14} C_1-C_{12}-Alkyl oder Phenyl darstellt,
R_{15} C_2-C_{10}-Alkylen, C_4-C_{50}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, Phenylen oder eine Gruppe -Phenylen-X-Phenylen-, worin X -O-, -S-, $-SO_2$-, $-CH_2$-oder $-C(CH_3)_2$- bedeutet, darstellt,
R_{16} C_2-C_{10}-Alkylen, C_2-C_{10}-Oxaalkylen oder C_2-C_{10}-Thiaalkylen, C_6-C_{12}-Arylen oder C_2-C_6-Alkenylen darstellt,
R_{17} C_2-C_{10}-Alkylen, Phenylen, Tolylen, Diphenylenmethan oder eine Gruppe

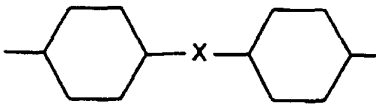


darstellt,
R_{18} C_2-C_{10}-Alkylen oder C_4-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt,

R_{19} C_3-C_{12}-Alkantriyl darstellt,
R_{20} C_4-C_{12}-Alkantetryl darstellt,
R_{27} C_2-C_{10}-Alkylen, Phenylen oder eine Gruppe



oder

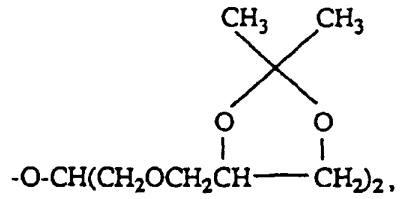


darstellt,
worin X O, S, SO_2, CH_2 oder $C(CH_3)_2$ darstellt und
R_{24} C_2-C_{14}-Alkylen, Vinylen oder o-Phenylen darstellt.

2. Organisches Material nach Anspruch 1, worin die Triazinverbindung (b) eine Verbindung der Formel I darstellt, worin n 1, 2 oder 4 ist, R_1 und R_2 unabhängig voneinander H oder CH_3 darstellen, R_3 und R_4 unabhängig voneinander H, CH_3 oder Cl darstellen, R_5 und R_6 Wasserstoff darstellen,

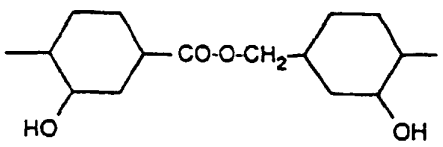
R_7, wenn n 1 ist,

a) C_1-C_{14}-Alkyl, das mit ein oder mehreren der Gruppen OH, C_1-C_{15}-Alkoxy, Allyloxy, Phenoxy, Furyloxy,

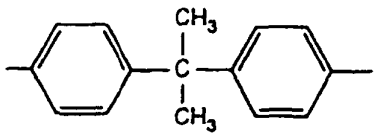


-COOR$_8$, -CON(R_9)(R_{10}) und/oder mit -OCOR_{11} substituiert ist,
b) C_6-C_{45}-Alkyl, das durch ein oder mehrere Atome O unterbrochen ist und mit OH oder/und Glycidyloxy substituiert sein kann,
c) Glycidyl oder
d) Hydroxycyclohexyl darstellt,

und wenn n 2 ist, R_7 C_6-C_{12}-Alkylen, 2-Butenylen-1,4, Xylylen, C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen oder mit OH substituiert ist, darstellt, oder R_7 eine Gruppe -CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-, -CO-R_{16}-CO-, -CH_2-COO-R_{18}-OOC-CH_2- oder

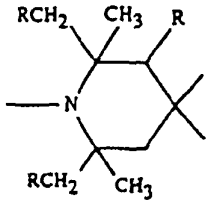


darstellt,
und wenn n 4 ist, R_7 $[CH_2COOCH_2]_4$-C darstellt,
R_8 C_4-C_{10}-Alkyl, Oleyl, C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist, darstellt, oder R_8 $-CH_2P(O)(OR_{14})_2$ darstellt,
R_9 und R_{10} C_2-C_6-Alkyl darstellen,
R_{11} C_6-C_{10}-Alkyl, C_2-C_3-Alkenyl darstellt,
R_{14} C_1-C_{12}-Alkyl darstellt,
R_{15} C_2-C_8-Alkylen, C_{10}-C_{45}-Alkylen, das durch mehr als ein Atom O unterbrochen ist oder eine Gruppe



bedeutet, darstellt,
R_{16} C_4-C_8-Alkylen darstellt und R_{18} C_4-C_8-Alkylen darstellt.

3. Organisches Material nach Anspruch 1, worin die Komponente (a) eine Verbindung, enthaltend mindestens eine Gruppe der Formel



worin R Wasserstoff oder Methyl darstellt, wobei R vorzugsweise Wasserstoff ist, darstellt.

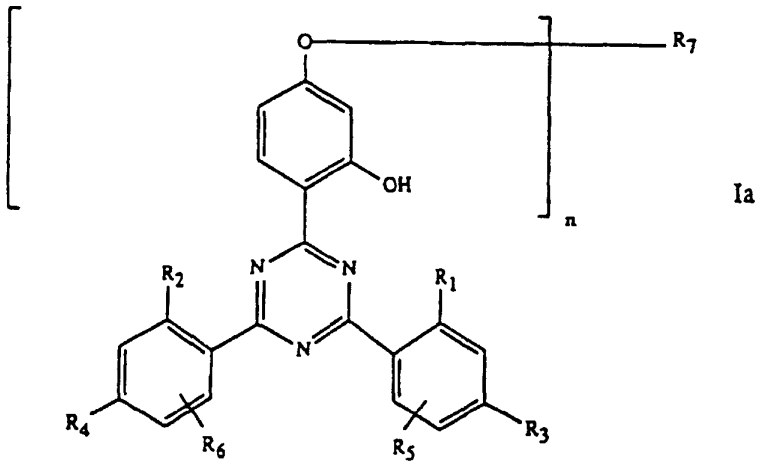
4. Organisches Material nach Anspruch 4, worin das Material ein organisches Polymer darstellt.

5. Organisches Polymer nach Anspruch 4, worin das Polymer ein Beschichtungsbindemittel darstellt.

6. Organisches Material nach Anspruch 1, worin das Material ein strahlungshärtbares Beschichtungsmaterial darstellt.

7. Strahlungshärtbares Beschichtungsmaterial, enthaltend ein Hydroxyphenyltriazin der Formel I, wie in Anspruch 1 definiert, in Abwesenheit eines sterisch gehinderten Amins.

8. Organisches Material, das gegen durch Licht, Wärme und Sauerstoff verursachte Schädigung stabilisiert wurde, enthaltend 0,01 bis 10 Gew.-% mindestens eine Verbindung der Formel Ia

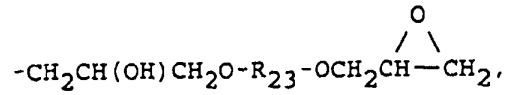


Ia

worin n 1 bis 4 ist,

R_1 und R_2 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl oder Trifluormethyl darstellen,
R_3 und R_4 unabhängig voneinander H, OH, C_1-C_{12}-Alkyl, Cyclohexyl, C_1-C_{18}-Alkoxy oder Halogen darstellen und im Fall, daß n = 1, ebenfalls einen Rest $-OR_7$ darstellen können,
R_5 und R_6 unabhängig voneinander H, C_1-C_{12}-Alkyl oder Halogen darstellen,
R_7, wenn n 1 ist,

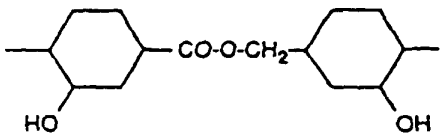
a) C_1-C_{12}-Alkyl, das mit Phenoxy, (das unsubstituiert oder mit C_1-C_{18}-Alkyl, C_1-C_{18}-Alkoxy oder Halogen substituiert ist) oder mit einer Gruppe $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$, $-N(R_9)(R_{10})$ oder $-O-CO-R_{22}$ substituiert ist,
b) C_4-C_{50}-Alkyl, das durch mehr als ein Atom O unterbrochen ist und mit OH oder/und Glycidyloxy substituiert sein kann,
c) Glycidyl oder eine Gruppe



d) Cyclohexyl, substituiert mit OH oder $-OCOR_{11}$,
e) eine Gruppe $-CH_2CH(OH)CH_2OR_{21}$,
f) eine Gruppe $-SO_2-R_{13}$,
g) eine Gruppe $-CO-R_{12}$ darstellt, und

wenn n 2 ist, R_7

a) C_2-C_{12}-Alkylen,
b) C_4-C_{12}-Alkenylen,
c) Xylylen,
d) C_3-C_{20}-Alkylen, das durch ein oder mehrere Atome O unterbrochen und/oder mit OH substituiert ist,
e) eine Gruppe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (worin m 1 bis 3 ist) oder



darstellt,
und wenn n 3 ist, R_7 eine Gruppe

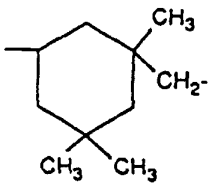
$$\{(CH_2)_m\text{-}COO\}_3\text{-}R_{19} \qquad \text{(worin m 1-3 ist),}$$

darstellt,
und wenn n 4 ist, R_7 eine Gruppe

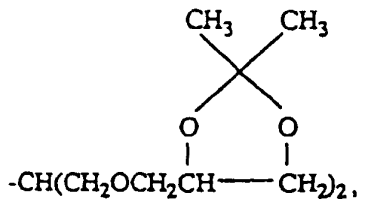
$$\{(CH_2)_m\text{-}COO\}_4\text{-}R_{20} \qquad \text{(worin m 1-3 ist),}$$

darstellt,

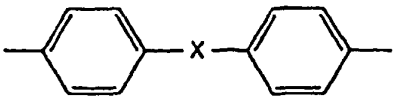
R_8 C_3-C_{20}-Alkyl, das durch ein oder mehrere Atome O, N oder S unterbrochen ist und mit OH substituiert sein kann, darstellt oder R_8 C_1-C_4-Alkyl, das mit -P(O)$(OR_{14})_2$, -N$(R_9)(R_{10})$ oder -OCOR_{11} substituiert ist, darstellt oder R_8 C_3-C_{18}-Alkenyl, Glycidyl oder C_7-C_{11}-Phenylalkyl darstellt,
R_9 und R_{10} unabhängig voneinander C_1-C_{12}-Alkyl, C_3-C_{12}-Alkoxyalkyl, C_4-C_{16}-Dialkylaminoalkyl oder C_5-C_{12}-Cycloalkyl darstellen oder R_9 und R_{10} zusammen C_3-C_9-Alkylen oder C_3-C_9-Oxaalkylen oder C_3-C_9-Azaalkylen darstellen,
R_{11} C_1-C_{18}-Alkyl, C_2-C_{18}-Alkenyl oder Phenyl darstellt,
R_{12} eine Gruppe -R_{24}-COOH oder -NH-R_{17}-NCO darstellt,
R_{13} C_1-C_{12}-Alkyl, C_6-C_{12}-Aryl oder C_7-C_{14}-Alkaryl darstellt,
R_{14} C_1-C_{12}-Alkyl oder Phenyl darstellt,
R_{15} C_2-C_{10}-Alkylen, C_4-C_{50}-Alkylen, das durch ein oder mehrere Atome O unterbrochen ist, darstellt oder R_{15} Phenylen oder eine Gruppe -Phenylen-X-Phenylen- darstellt, worin X -O-, -S-, -SO_2-, -CH_2- oder -$C(CH_3)_2$- darstellt,
R_{17} C_2-C_{10}-Alkylen, Phenylen, Tolylen, Diphenylenmethan oder eine Gruppe



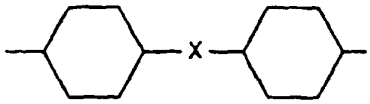
darstellt,
R_{18} C_2-C_{10}-Alkylen oder C_4-C_{20}-Alkylen darstellt, das durch ein oder mehrere Atome O unterbrochen ist,
R_{19} C_3-C_{12}-Alkantriyl darstellt,
R_{20} C_4-C_{12}-Alkantetryl darstellt,
R_{21} C_1-C_{18}-Alkyl, C_3-C_{18}-Alkenyl, Phenyl, Phenyl, das mit C_1-C_{12}-Alkyl, C_1-C_{12}-Alkoxy oder Halogen substituiert ist, darstellt, oder R_{21} C_2-C_{19}-Alkanoyl, Benzoyl, C_3-C_{18}-Alkenoyl, Furyl oder eine Gruppe



darstellt,
R_{22} C_2-C_5-Alkenyl darstellt,
R_{23} C_2-C_{10}-Alkylen, Phenylen oder eine Gruppe



oder



darstellt,
worin X O, S, SO_2, CH_2 oder $C(CH_3)_2$ darstellt und
R_{24} C_2-C_{14}-Alkylen, Vinylen oder o-Phenylen darstellt.

9. Organisches Polymer als Material nach Anspruch 8.

10. Polycarbonat nach Anspruch 9.

11. Organisches Material nach Anspruch 8, das ein strahlungshärtbares Beschichtungsmaterial darstellt.

12. Verwendung der Verbindungen nach Anspruch 8 der Formel Ia als Stabilisator für organische Materialien, insbesondere für organische Polymere.

13. Verwendung nach Anspruch 12 als Stabilisator für Polycarbonate.

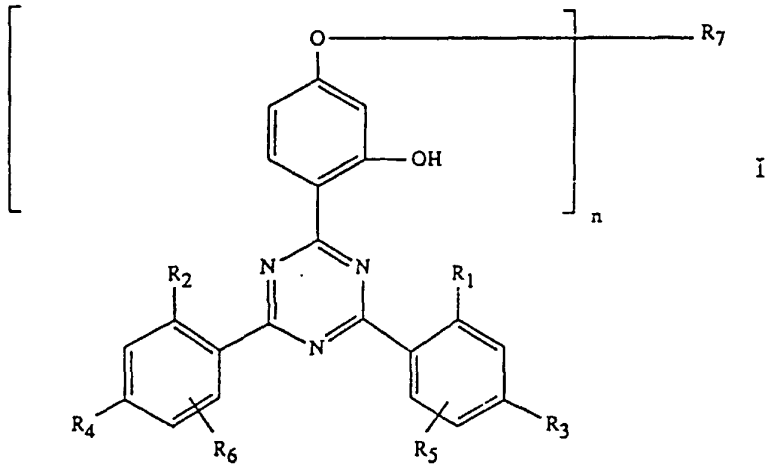
14. Verwendung der Verbindungen nach Anspruch 8 der Formel Ia als Stabilisator für strahlungshärtbares Beschichtungsmaterial.

Revendications

Revendications pour les Etats contractants suivants : AT, BE, CH, DE, FR, GB, IT, LI, NL

1. Une matière organique qui a été stabilisée contre une dégradation provoquée par la lumière, la chaleur et l'oxygène, et qui contient

(a) au moins une amine à empêchement stérique du type polyalkylpipéridine, et
(b) au moins une o-hydroxyphényl-s-triazine,
dans laquelle le composé triazinique (b) est un composé de la formule I

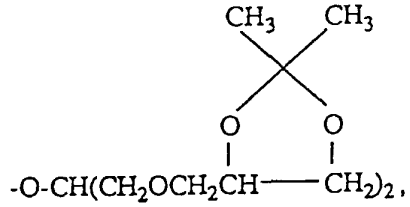


I

dans laquelle

n	est de 1 à 4,
R_1 et R_2	sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou trifluorométhyle,
R_3 et R_4	sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou alcoxy en C_1-C_{18} ou un halogène, et, dans le cas où n = 1, peuvent aussi être un radical $-OR_7$,
R_5 et R_6	sont chacun, indépendamment de l'autre, H, un groupe alkyle en C_1-C_{12} ou un halogène,
R_7,	si n est 1, est

a) un groupe alkyle en C_1-C_{18} qui est substitué par un ou plusieurs des groupes OH, alcoxy en C_1-C_{18}, alcénoxy en C_3-C_{18}, halogéno, phénoxy (qui n'est pas substitué ou est substitué par un groupe alkyle en C_1-C_{18}, alcoxy en C_1-C_{18} ou halogéno), furyloxy,

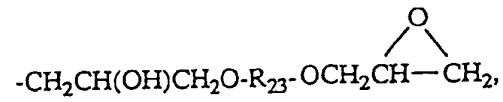


-COOH, $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$, $-N(R_9)(R_{10})$, $-NHCOR_{11}$, -CN et/ou par $-O-CO-R_{11}$,

b) un groupe alkyle en C_4-C_{50} qui est interrompu par un ou plusieurs O et peut être substitué par OH et/ou un groupe glycidyloxy,

c) un groupe alcényle en C_3-C_6,

d) un groupe glycidyle ou un groupe

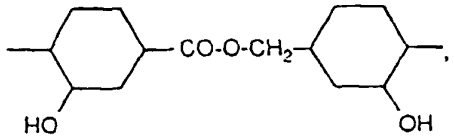


e) un groupe cyclohexyle qui n'est pas substitué ou est substitué par OH ou $-OCOR_{11}$,

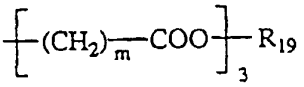
f) un groupe phénylalkyle en C_7-C_{11} qui n'est pas substitué ou est substitué par OH, Cl ou CH_3,
g) -CO-R_{12} ou
h) -SO_2-R_{13},

et si n est 2, R_7 est

a) un groupe alkylène en C_2-C_{16},
b) un groupe alcénylène en C_4-C_{12},
c) un groupe xylylène,
d) un groupe alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH,
e) un groupe -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CO-NH-R_{17}-NH-CO- ou -$(CH_2)_m$-COO-R_{18}-OOC-$(CH_2)_m$- (où m est de 1 à 3) ou

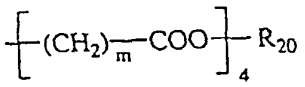


et si n est 3, R_7 est un groupe



m = 1 à 3,

et si n est 4, R_7 est un groupe



m = 1 à 3,

R_8 est un groupe alkyle en C_1-C_{18}, un groupe alcényle en C_3-C_{18}, un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O, N ou S et/ou substitué par OH, un groupe alkyle en C_1-C_4 qui est substitué par -$P(O)(OR_{14})_2$, -$N(R_9)(R_{10})$ ou -$OCOR_{11}$ et/ou OH, un groupe alcényle en C_3-C_{18}, un groupe glycidyle ou un groupe phénylalkyle en C_7-C_{11},

R_9 et R_{10} sont chacun, indépendamment de l'autre, un groupe alkyle en C_1-C_{12}, alcoxyalkyle en C_3-C_{12}, dialkylaminoalkyle en C_4-C_{16} ou cycloalkyle en C_5-C_{12}, ou bien R_9 et R_{10} forment ensemble un groupe alkylène en C_3-C_9 ou oxaalkylène en C_3-C_9 ou azaalkyl'C_3-C_9,

R_{11} est un groupe alkyle en C_1-C_{18}, alcényle en C_2-C_{18} ou phényle,

R_{12} est un groupe alkyle en C_1-C_{18}, alcényle en C_2-C_{18}, phényle, alcoxy en C_1-C_{12}, phénoxy, alkylamino en C_1-C_{12}, arylamino en C_6-C_{12}, -R_{24}-COOH ou -NH-R_{17}-NCO,

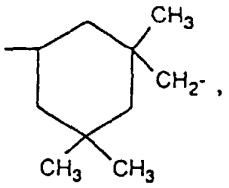
R_{13} est un groupe alkyle en C_1-C_{12}, aryle en C_6-C_{12} ou alkaryle en C_7-C_{14},

R_{14} est un groupe alkyle en C_1-C_{12} ou phényle,

R_{15} est un groupe alkylène en C_2-C_{10}, un groupe alkylène en C_4-C_{50} qui est interrompu par un ou plusieurs O, un groupe phénylène ou un groupe -phénylène-X-phénylène- où X est -O-, -S-, -SO_2-, -CH_2- ou -$C(CH_3)_2$-,

R_{16} est un groupe alkylène en C_2-C_{10}, oxaalkylène en C_2-C_{10}, thiaalkylène en C_2-C_{10}, arylène en C_6-C_{12} ou alcénylène en C_2-C_6,

R_{17} est un groupe alkylène en C_2-C_{10}, phénylène, tolylène, diphénylèneméthane ou un groupe

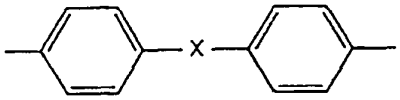


R_{18} est un groupe alkylène en C_2-C_{10} ou un groupe alkylène en C_4-C_{20} qui est interrompu par un ou plusieurs O,

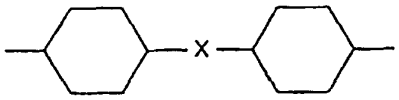
R_{19} est un groupe alcanetriyle en C_3-C_{12},

R_{20} est un groupe alcanetétrayle en C_4-C_{12},

R_{23} est un groupe alkylène en C_2-C_{10}, un groupe phénylène ou un groupe



ou



où X est O, S, SO_2, CH_2 ou $C(CH_3)_2$, et

R_{24} est un groupe alkylène en C_2-C_{14}, vinylène ou *o*-phénylène.

2. Une matière organique selon la revendication 1, dans laquelle le composé triazinique (b) est un composé de formule I dans lequel

n est de 1 à 4,

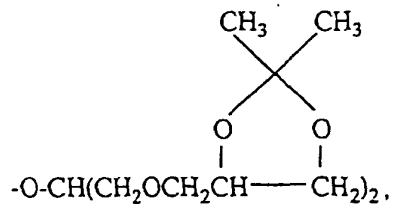
R_1 et R_2 sont chacun, indépendamment de l'autre, H, OH ou un groupe alkyle en C_1-C_4,

R_3 et R_4 sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_4, un groupe alcoxy en C_1-C_4, un halogène ou un radical $-OR_7$,

R_5 et R_6 sont chacun, indépendamment de l'autre, H ou un groupe alkyle en C_1-C_4,

R_7, si n est 1, est

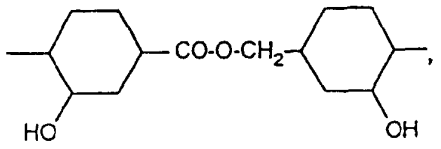
a) un groupe alkyle en C_1-C_{18} qui est substitué par un ou plusieurs des groupes OH, alcoxy en C_1-C_{18}, allyloxy, phénoxy, furyloxy,



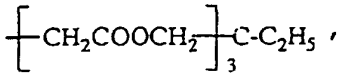
$-COOR_8$, $-CON(R_9)(R_{10})$ et/ou par $-OCOR_{11}$,

b) un groupe alkyle en C_4-C_{50} qui est interrompu par un ou plusieurs O et peut être substitué par OH et/ou un groupe glycidyloxy,

c) un groupe allyle, glycidyle ou benzyle,
d) un groupe cyclohexyle ou hydroxycyclohexyle, et si n est 2, R_7 est un groupe alkylène en C_4-C_{12}, alcénylène en C_4-C_6, xylylène, alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH, ou bien R_7 est un groupe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CO-R_{16}-CO-$, $-CH_2-COO-R_{18}-OOC-CH_2-$ ou



et si n est 3, R_7 est un groupe



et si n est 4, R_7 est un groupe

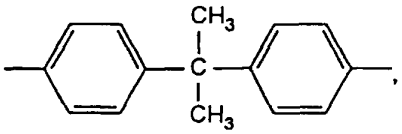
R_8 est un groupe alkyle en C_1-C_{12}, alcényle en C_3-C_{18}, alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH, ou bien R_8 est un groupe alkyle en C_1-C_4 qui est substitué par $-P(O)(OR_{14})_2$,

R_9 et R_{10} sont des groupes alkyle en C_1-C_6 ou bien R_9 et R_{10} forment ensemble un groupe pentaméthylène ou 3-oxapentaméthylène,

R_{11} est un groupe alkyle en C_1-C_{12}, alcényle en C_2-C_5 ou phényle,

R_{14} est un groupe alkyle en C_1-C_{12},

R_{15} est un groupe alkylène en C_2-C_8, un groupe alkylène en C_4-C_{50} qui est interrompu par un ou plusieurs O, ou un groupe



R_{16} est un groupe alkylène en C_2-C_8, oxaalkylène en C_2-C_6 ou thiaalkylène en C_2-C_6, et

R_{18} est un groupe alkylène en C_4-C_8 ou alkylène en C_4-C_{12} qui est interrompu par un ou plusieurs O.

3. Une matière organique selon la revendication 1, dans laquelle le composé triazinique (b) est un composé de formule I dans lequel

n est 1, 2 ou 4,

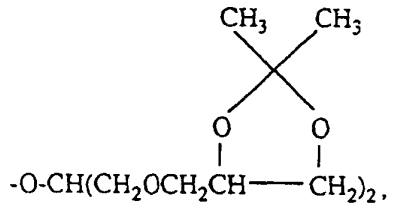
R_1 et R_2 sont chacun, indépendamment de l'autre, H ou CH_3,

R_3 et R_4 sont chacun, indépendamment de l'autre, H, CH_3 ou Cl,

R_5 et R_6 sont chacun l'hydrogène,

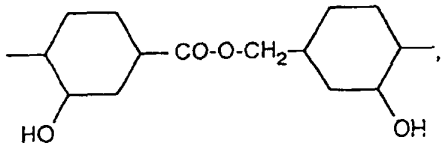
R_7, si n est 1, est

a) un groupe alkyle en C_1-C_{14} qui est substitué par un ou plusieurs des groupes OH, alcoxy en C_1-C_{15}, allyloxy, phénoxy, furyloxy,

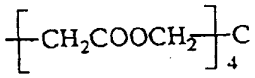


$-COOR_8$, $-CON(R_9)(R_{10})$ et/ou $-OCOR_{11}$,
b) un groupe alkyle en C_6-C_{45} qui est interrompu par un ou plusieurs O et peut être substitué par OH et/ou un groupe glycidyloxy,
c) un groupe glycidyle ou
d) un groupe hydroxycyclohexyle,

et si n est 2, R_7 est un groupe alkylène en C_6-C_{12}, un groupe 2-buténylène-1,4, un groupe xylylène, un groupe alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O ou substitué par OH, ou bien R_7 est un groupe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CO-R_{16}-CO-$, $-CH_2-COO-R_{18}-OOC-CH_2-$ ou



et si n est 4, R_7 est



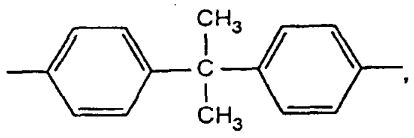
R_8 est un groupe alkyle en C_4-C_{10}, un groupe oléyle, un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH, ou bien R_8 est $-CH_2P(O)(OR_{14})_2$,

R_9 et R_{10} sont des groupes alkyle en C_2-C_6,

R_{11} est un groupe alkyle en C_6-C_{10} ou alcényle en C_2-C_3,

R_{14} est un groupe alkyle en C_1-C_{12},

R_{15} est un groupe alkylène en C_2-C_8, un groupe alkylène en C_{10}-C_{45} qui est interrompu par plus d'un O, ou est un groupe



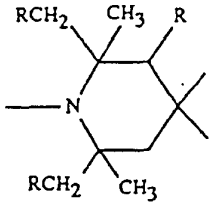
R_{16} est un groupe alkylène en C_4-C_8, et

R_{18} est un groupe alkylène en C_4-C_8.

4. Une matière organique selon la revendication 1, dans laquelle le composant (b) est un composé de formule I dans lequel n est 1 ou 2 et, si n est 1, R_7 est un groupe $-CH_2CH(OH)CH_2-OR_{21}$ où R_{21} est un groupe alkyle en C_1-C_{18}, allyle, phényle, furyle, alcanoyle en C_6-C_{12} ou alcénoyle en C_3-C_5, et, si n est 2, R_7 est un groupe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$ où R_{15} est tel que défini dans la revendication 1.

5. Une matière organique selon la revendication 1, dans laquelle le composant (b) est un composé de formule I dans lequel R_1 et R_2 sont l'hydrogène ou le groupe méthyle, R_3 et R_4 sont l'hydrogène, le chlore ou le groupe méthyle, et R_5 et R_6 sont l'hydrogène.

6. Une matière organique selon la revendication 1, dans laquelle le composant (a) est un composé contenant au moins un groupe de la formule



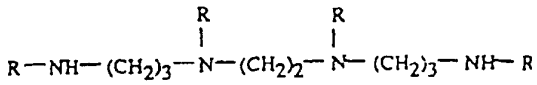
dans laquelle R est l'hydrogène ou le groupe méthyle.

7. Une matière organique selon la revendication 6, dans laquelle R est l'hydrogène.

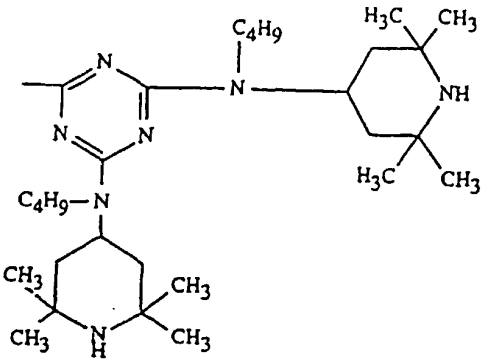
8. Une matière organique selon la revendication 6, dans laquelle le composant (a) est l'un des composés suivants :

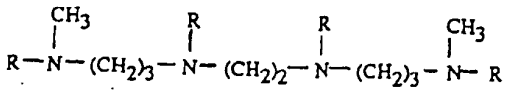
succinate de bis(2,2,6,6-tétraméthylpipéridine-4-yle),
sébacate de bis(2,2,6,6-tétraméthylpipéridine-4-yle),
sébacate de bis(1,2,2,6,6-pentaméthylpipéridine-4-yle),
butyl-(3,5-di-*tert*-butyl-4-hydroxybenzyl)malonate de bis(1,2,2,6,6-pentaméthylpipéridine-4-yle),
sébacate de bis(1-octyloxy-2,2,6,6-tétraméthylpipéridine-4-yle),
butane-1,2,3,4-tétracarboxylate de tétra(2,2,6,6-tétraméthylpipéridine-4-yle),
butane-1,2,3,4-tétracarboxylate de tétra(1,2,2,6,6-pentaméthylpipéridine-4-yle),
ester dodécylique d'acide N-(2,2,6,6-tétraméthylpipéridine-4-yl)-β-aminopropionique,
N-(1-octyloxy-2,2,6,6-tétraméthylpipéridine-4-yl)-N'-dodécyloxalamide,
N-(2,2,6,6-tétraméthylpipéridine-4-yl)-α-dodécylsuccinimide, 2,2,4,4-tétraméthyl-7-oxa-3,20-diaza-21-oxo-dispiro-[5.1.11.2]henéicosane,
8-acétyl-3-dodécyl-1,3,8-triaza-7,7,9,9-tétraméthylspiro-[4.5]décane-2,4-dione,
20-(dodécyloxycarbonyléthyl)-2,2,4,4-tétraméthyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]henéicosane,

ou un composé de l'une des formules

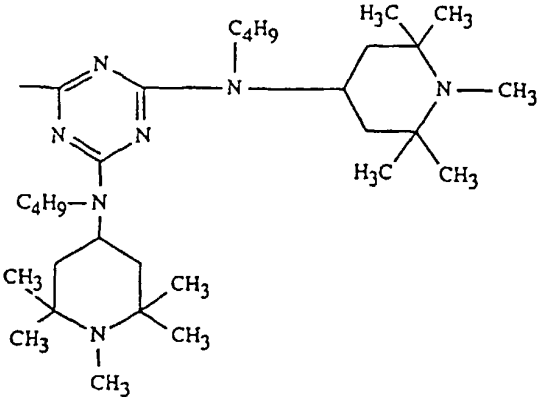


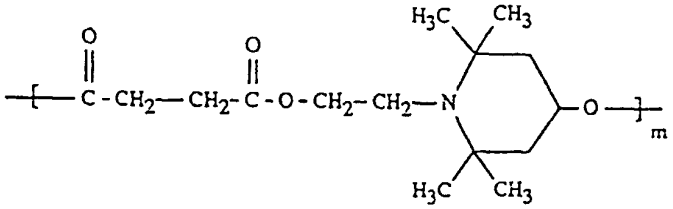
où R =

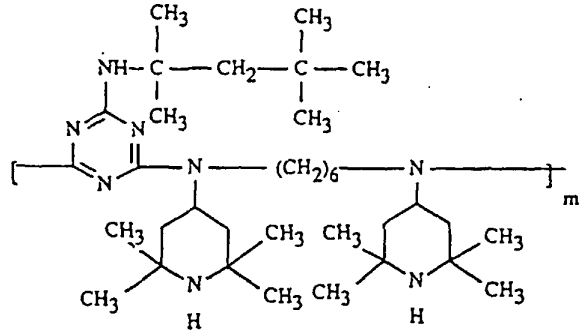


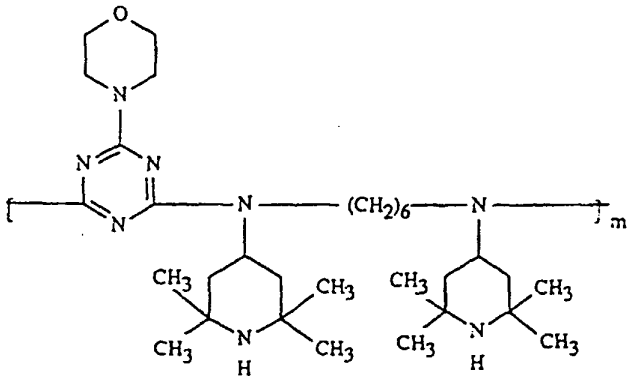


où R =

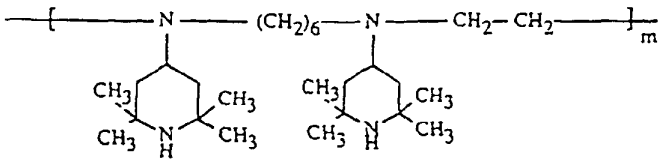








où



9. Une matière organique selon la revendication 1, qui contient 0,01 à 5 % en poids du composant (a) et 0,02 à 5 % en poids du composant (b) par rapport à la matière.

10. Une matière organique selon la revendication 9, qui contient 0,02 à 2 % en poids du composant (a) et 0,05 à 3 % en poids du composant (b).

11. Une matière organique selon la revendication 1, dans laquelle la matière est un polymère organique.

12. Un polymère organique selon la revendication 11, qui, en plus des composants (a) et (b), contient également d'autres stabilisants, des charges, des agents de renforcement, des pigments, des colorants, des plastifiants, des solvants, des lubrifiants, des agents de réglage de l'écoulement, des agents d'avivage fluorescents, des agents de nucléation, des agents antiélectrostatiques ou des agents ignifugeants.

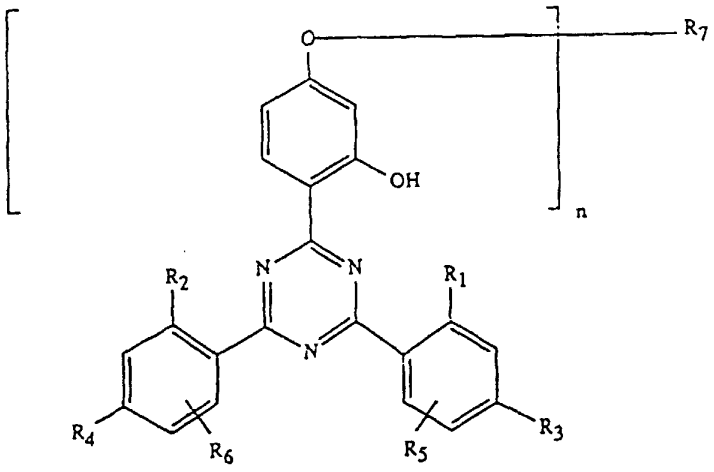
13. Un polymère organique selon la revendication 11, dans lequel le polymère est un liant de revêtement.

14. Une matière organique selon la revendication 1, dans laquelle la matière est une matière de revêtement durcissable par irradiation.

15. Une matière de revêtement durcissable par irradiation contenant une hydroxyphényltriazine de formule I telle que définie dans la revendication 1, en l'absence d'une amine à empêchement stérique.

16. Un procédé pour stabiliser une matière organique contre une dégradation provoquée par la lumière, la chaleur et l'oxygène, par l'addition des composants (a) et (b) tels que définis dans la revendication 1.

17. Un composé de la formule Ia



Ia

dans laquelle

n est de 1 à 4,

R_1 et R_2 sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou trifluorométhyle,

R_3 et R_4 sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou alcoxy en C_1-C_{18} ou un halogène, et, dans le cas où n = 1, peuvent aussi être un radical $-OR_7$,

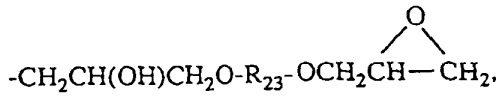
R_5 et R_6 sont chacun, indépendamment de l'autre, H, un groupe alkyle en C_1-C_{12} ou un halogène,

R_7, Si n est 1, est

a) un groupe alkyle en C_1-C_{12} qui est substitué par un groupe phénoxy (qui n'est pas substitué ou est substitué par un groupe alkyle en C_1-C_{18}, alcoxy en C_1-C_{18} ou halogéno) ou par un groupe $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$, $-N(R_9)(R_{10})$ ou $-O-CO-R_{22}$,

b) un groupe alkyle en C_4-C_{50} qui est interrompu par plus d'un O et peut être substitué par OH et/ou un groupe glycidyloxy,

c) un groupe glycidyle ou un groupe



$-CH_2CH(OH)CH_2O-R_{23}-OCH_2CH-CH_2$,

d) un groupe cyclohexyle substitué par OH ou $-OCOR_{11}$,

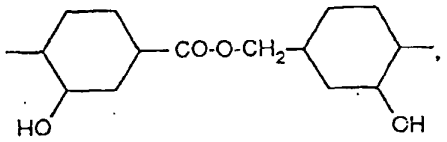
e) un groupe $-CH_2CH(OH)CH_2OR_{21}$

f) un groupe $-SO_2-R_{13}$,

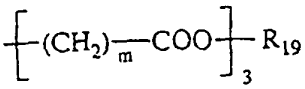
g) un groupe $-CO-R_{12}$,

et, si n est 2, R_7 est

a) un groupe alkylène en C_2-C_{12},
b) un groupe alcénylène en C_4-C_{12},
c) un groupe xylylène,
d) un groupe alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH,
e) un groupe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (où m est de 1 à 3) ou

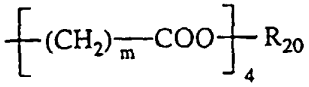


et, si n est 3, R_7 est un groupe



(où m = 1 à 3),

et, si n est 4, R_7 est un groupe



(où m = 1 à 3),

R_8 est un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O, N ou S et peut être substitué par OH, ou bien R_8 est un groupe alkyle en C_1-C_4 qui est substitué par $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ ou $-OCOR_{11}$, ou bien R_8 est un groupe alcényle en C_3-C_{18}, glycidyle ou phénylalkyle en C_7-C_{11},

R_9 et R_{10} sont chacun, indépendamment de l'autre, un groupe alkyle en C_1-C_{12}, alcoxyalkyle en C_3-C_{12}, dialkylaminoalkyle en C_4-C_{16} ou cycloalkyle en C_5-C_{12}, ou bien R_9 et R_{10} forment ensemble un groupe alkylène en C_3-C_9 ou oxaalkylène en C_3-C_9 ou azaalkylène en C_3-C_9,

R_{11} est un groupe alkyle en C_1-C_{18}, alcényle en C_2-C_{18} ou phényle,

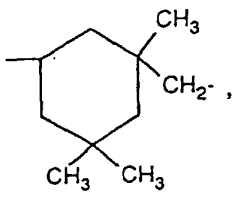
R_{12} est un groupe $-R_{24}-COOH$ ou $-NH-R_{17}-NCO$,

R_{13} est un groupe alkyle en C_1-C_{12}, aryle en C_6-C_{12} ou alkaryle en C_7-C_{14},

R_{14} est un groupe alkyle en C_1-C_{12} ou phényle,

R_{15} est un groupe alkylène en C_2-C_{10}, un groupe alkylène en C_4-C_{50} qui est interrompu par un ou plusieurs O, ou bien R_{15} est un groupe phénylène ou un groupe -phénylène-X-phénylène- où X est -O-, -S-, $-SO_2-$, $-CH_2-$ ou $-C(CH_3)_2-$,

R_{17} est un groupe alkylène en C_2-C_{10}, phénylène, tolylène, diphénylèneméthane ou un groupe

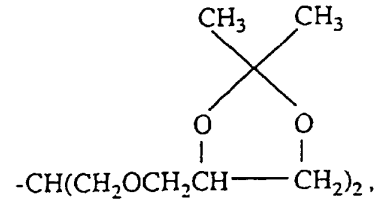


R_{18} est un groupe alkylène en C_2-C_{10} ou un groupe alkylène en C_4-C_{20} qui est interrompu par un ou plusieurs O,

R_{19} est un groupe alcanetriyle en C_3-C_{12},

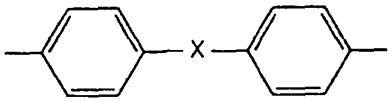
R_{20} est un groupe alcanetétrayle en C_4-C_{12},

R_{21} est un groupe alkyle en C_1-C_{18}, un groupe alcényle en C_3-C_{18}, un groupe phényle ou un groupe phényle substitué par un groupe alkyle en C_1-C_{12}, alcoxy en C_1-C_{12} ou halogéno, ou bien R_{21} est un groupe alcanoyle en C_2-C_{19}, un groupe benzoyle, un groupe alcénoyle en C_3-C_{18}, un groupe furyle ou un groupe

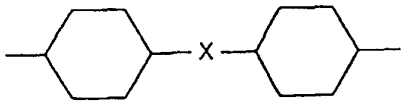


R_{22} est un groupe alcényle en C_2-C_5,

R_{23} est un groupe alkylène en C_2-C_{10}, un groupe phénylène ou un groupe



ou



où X est O, S, SO_2, CH_2 ou $C(CH_3)_2$, et

R_{24} est un groupe alkylène en C_2-C_{14}, vinylène ou *o*-phénylène.

18. Un composé de formule Ia selon la revendication 17, dans lequel

n est 1 ou 2,

R_1 et R_2 sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12} ou halogénométhyle,

R_3 et R_4 sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, alcoxy en C_1-C_{18} ou un halogène, et, dans le cas où n = 1, peuvent aussi être un radical $-OR_7$,

R_5 et R_6 sont chacun, indépendamment de l'autre, H, un groupe alkyle en C_1-C_{12} ou un halogène,

R_7, si n est 1, est un groupe alkyle en C_1-C_{12} qui est substitué par un groupe phénoxy qui n'est pas substitué ou est substitué par un groupe alkyle en C_1-C_{18}, alcoxy en C_1-C_{18} ou halogéno, un groupe alkyle en C_1-C_{12} qui est substitué par $-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$ ou $-N(R_9)(R_{10})$, un groupe alkyle en C_6-C_{20} qui est interrompu par plus d'un O et est substitué par OH, un groupe glycidyle, un groupe cyclohexyle substitué par OH ou $-OCOR_{11}$, un groupe $-CH_2CH(OH)CH_2OR_{21}$ ou un groupe $-SO_2R_{13}$, et, si n est 2, R_7 est un groupe alkylène en C_2-C_{12}, un groupe alcénylène en C_4-C_{12}, un groupe xylylène, un groupe alkylène en C_3-C_{20} qui est interrompu par O et/ou substitué par OH, ou un groupe $-CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$- ou $-(CH_2)_m$-COO-R_{18}-OOC-$(CH_2)_m$- où m est de 1 à 3,

R_8 est un groupe alkyle en C_3-C_{20} qui est interrompu par O, N ou S et/ou substitué par OH, ou est un groupe alkyle en C_1-C_4 qui est substitué par $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ ou $-OCOR_{11}$, ou est un groupe alcényle en C_3-C_{18}, glycidyle ou phénylalkyle en C_7-C_{11},

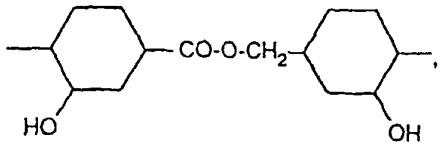
R_9 et R_{10} sont chacun, indépendamment de l'autre, un groupe alkyle en C_1-C_{12}, alcoxyalkyle en C_3-C_{12}, dialkylaminoalkyle en C_4-C_{16} ou cycloalkyle en C_5-C_{12}, ou bien R_9 et R_{10} forment ensemble un groupe alkylène en C_3-C_9 ou oxaalkylène en C_3-C_9 ou azaalkylène en C_3-C_9,

R_{11} est un groupe alkyle en C_1-C_{18}, alcényle en C_2-C_{16} ou phényle,

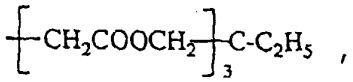
R_{13} est un groupe alkyle en C_1-C_{12}, aryle en C_6-C_{12} ou alkaryle en C_7-C_{14},
R_{14} est un groupe alkyle en C_1-C_{12} ou phényle,
R_{15} est un groupe alkylène en C_2-C_{10}, un groupe phénylène ou un groupe -phénylène-X-phénylène- où X est -O-, -S-, $-SO_2-$, $-CH_2-$ ou $-C(CH_3)_2-$,
R_{18} est un groupe alkylène en C_2-C_{10} ou un groupe alkylène en C_4-C_{20} qui est interrompu par O, et
R_{21} est un groupe alkyle en C_1-C_{18}, un groupe phényle, un groupe phényle substitué par un groupe alkyle en C_1-C_{12}, alcoxy en C_1-C_{12} ou halogéno, ou est un groupe alcanoyle en C_2-C_{12}, benzoyle ou alcénoyle en C_3-C_5.

19. Un composé de formule Ia selon la revendication 17, dans lequel

n est de 1 à 4,
R_1 et R_2 sont chacun, indépendamment de l'autre, H, OH ou un groupe alkyle en C_1-C_4,
R_3 et R_4 sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_4, un groupe alcoxy en C_1-C_4, un halogène ou un radical $-OR_7$,
R_5 et R_6 sont chacun, indépendamment de l'autre, H ou un groupe alkyle en C_1-C_4,
R_7, si n est 1, est un groupe alkyle en C_1-C_6 qui est substitué par $-COOR_8$, $-COONHR_9$, $-CON(R_9)(R_{10})$ ou $-OCOR_{22}$, ou bien R_7 est un groupe glycidyle, hydroxycyclohexyle ou $-CH_2CH(OH)CH_2OR_{21}$, et si n est 2, R_7 est un groupe alkylène en C_4-C_{12}, alcénylène en C_4-C_6, xylylène, alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH, ou bien R_7 est un groupe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CH_2-COO-R_{18}-OOCCH_2-$ ou



et si n est 3, R_7 est un groupe



et si n est 4, R_7 est un groupe

R_8 est un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O et peut être substitué par OH, ou bien R_8 est un groupe alkyle en C_1-C_4 qui est substitué par $-P(O)(OR_{14})_2$, ou bien R_8 est un groupe alcényle en C_3-C_{18},
R_9 et R_{10} sont chacun indépendamment un groupe alkyle en C_1-C_8 ou cyclohexyle, ou bien R_9 et R_{10} forment ensemble un groupe pentaméthylène ou 3-oxapentaméthylène,
R_{14} est un groupe alkyle en C_1-C_{12},
R_{15} est un groupe alkylène en C_2-C_8, un groupe alkylène en C_4-C_{50} qui est interrompu par un ou plusieurs O, ou bien R_{15} est un groupe -phénylène-X-phénylène où X est -O-, $-CH_2-$ ou $-C(CH_3)_2-$,
R_{18} est un groupe alkylène en C_4-C_8 ou un groupe alkylène en C_4-C_{12} qui est interrompu par un ou plusieurs O,
R_{21} est un groupe alkyle en C_4-C_{18}, allyle, phényle, furyle, alcanoyle en C_5-C_{19} ou alcénoyle en C_3-C_5, et
R_{22} est un groupe alcényle en C_2-C_5,

20. Un composé de formule Ia selon la revendication 17, dans lequel

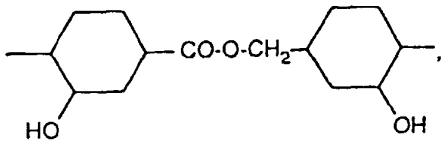
n est 1, 2 ou 4,

R_1 et R_2 sont chacun, indépendamment de l'autre, H ou CH_3,

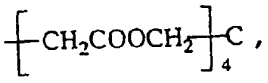
R_3 et R_4 sont chacun, indépendamment de l'autre, H, CH_3 ou Cl,

R_5 et R_6 sont chacun l'hydrogène,

R_7, si n est 1, est un groupe alkyle en C_1-C_4 qui est substitué par $-COOR_8$, $-CON(R_9)(R_{10})$ ou $-O-COR_{22}$, ou bien R_7 est un groupe glycidyle, 2-hydroxycyclohexyle ou $-CH_2CH(OH)CH_2OR_{21}$, et si n est 2, R_7 est un groupe alkylène en C_6-C_{12}, un groupe 2-butène-1,4-ylène, un groupe xylylène ou un groupe alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH, ou bien R_7 est un groupe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-CH_2COO-R_{18}-OOCCH_2-$ ou



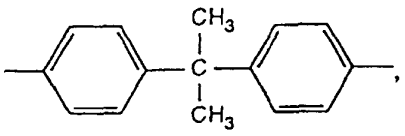
et si n est 4, R_7 est un groupe



R_8 est un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O et peut être substitué par OH, ou bien R_8 est $-CH_2P(O)(OR_{14})_2$ ou un groupe oléyle

R_9 et R_{10} sont des groupes alkyle en C_2-c_6,

R_{15} est un groupe alkylène en C_2-C_8, un groupe alkylène en C_{10}-C_{45} qui est interrompu par un ou plusieurs O, ou un groupe



R_{18} est un groupe alkylène en C_4-C_8,

R_{21} est un groupe alkyle en C_4-C_{15}, allyle, phényle, furyle, alcanoyle en C_5-C_{12} ou alcénoyle en C_3-C_5, et

R_{22} est un groupe alcényle en C_2-C_3.

21. Un composé de formule Ia selon la revendication 17, dans lequel n est 2.

22. Un procédé pour stabiliser une matière organique, en particulier des polymères organiques, contre une dégradation provoquée par la lumière, la chaleur et l'oxygène, par l'addition d'une *o*-hydroxyphényltriazine, qui comprend l'addition d'au moins un composé de formule Ia selon la revendication 17.

23. Une matière organique contenant au moins un composé de formule Ia selon la revendication 17 comme stabilisant contre une dégradation provoquée par la lumière, la chaleur et l'oxygène.

24. Un polymère organique en tant que matière selon la revendication 23.

25. Une matière organique selon la revendication 23, contenant 0,01 à 10 % en poids d'un composé de formule Ia, par rapport à la matière.

26. Un polycarbonate selon la revendication 24.

27. Une matière organique selon la revendication 23, qui est une matière de revêtement durcissable par irradiation.

28. L'utilisation des composés de formule Ia de la revendication 17 comme stabilisant pour matières organiques, en particulier pour polymères organiques.

29. Utilisation selon la revendication 28, comme stabilisant pour polycarbonates.

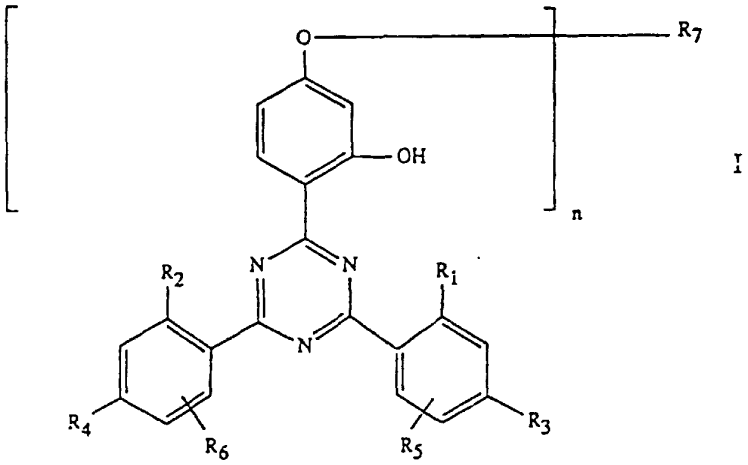
30. L'utilisation des composés de formule Ia de la revendication 17, comme stabilisant pour matière de revêtement durcissable par irradiation.

Revendications pour l'Etat contractant suivant : ES

1. Une matière organique qui a été stabilisée contre une dégradation provoquée par la lumière, la chaleur et l'oxygène et qui contient

(a) 0,01 à 5 % en poids d'au moins une amine à empêchement stérique du type polyalkylpipéridine, et
(b) 0,02 à 5 % en poids d'au moins une *o*-hydroxyphényl-s-triazine,

dans laquelle le composé triazinique (b) est un composé de la formule I

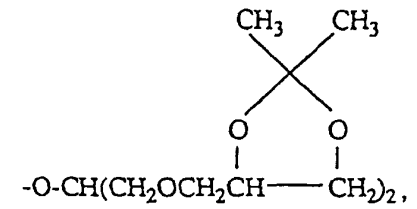


I

dans laquelle

n	est de 1 à 4,
R_1 et R_2	sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou trifluorométhyle,
R_3 et R_4	sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou alcoxy en C_1-C_{18} ou un halogène, et, dans le cas où n = 1, peuvent aussi être un radical $-OR_7$,
R_5 et R_6	sont chacun, indépendamment de l'autre, H, un groupe alkyle en C_1-C_{12} ou un halogène,
R_7,	Si n est 1, est

a) un groupe alkyle en C_1-C_{18} qui est substitué par un ou plusieurs des groupes OH, alcoxy en C_1-C_{18}, alcénoxy en C_3-C_{18}, halogéno, phénoxy (qui n'est pas substitué ou est substitué par un groupe alkyle en C_1-C_{18}, alcoxy en C_1-C_{18} ou halogéno), furyloxy,

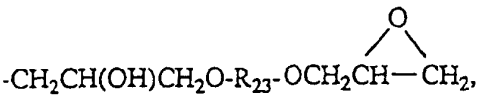


-COOH, -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, -NHR_9, -$N(R_9)(R_{10})$, -$NHCOR_{11}$, -CN et/ou par -O-CO-R_{11},

b) un groupe alkyle en C_4-C_{50} qui est interrompu par un ou plusieurs O et peut être substitué par OH et/ou un groupe glycidyloxy,

c) un groupe alcényle en C_3-C_6,

d) un groupe glycidyle ou un groupe



e) un groupe cyclohexyle qui n'est pas substitué ou est substitué par OH ou -$OCOR_{11}$,

f) un groupe phénylalkyle en C_7-C_{11} qui n'est pas substitué ou est substitué par OH, Cl ou CH_3,

g) -CO-R_{12} ou

h) -SO_2-R_{13},

et si n est 2, R_7 est

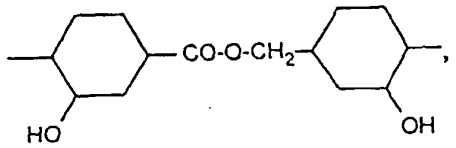
a) un groupe alkylène en C_2-C_{16},

b) un groupe alcénylène en C_4-C_{12},

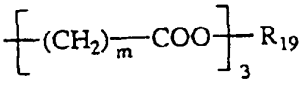
c) un groupe xylylène,

d) un groupe alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH,

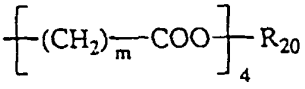
e) un groupe -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CO-NH-R_{17}-NH-CO- ou -$(CH_2)_m$-COO-R_{18}-OOC-$(CH_2)_m$- (où m est de 1 à 3) ou



et si n est 3, R_7 est un groupe



et si n est 4, R_7 est un groupe



R_8 est un groupe alkyle en C_1-C_{18}, un groupe alcényle en C_3-C_{18}, un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O, N ou S et/ou substitué par OH, un groupe alkyle en C_1-C_4 qui est substitué par $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ ou $-OCOR_{11}$ et/ou OH, un groupe alcényle en C_3-C_{18}, un groupe glycidyle ou un groupe phénylalkyle en C_7-C_{11},

R_9 et R_{10} sont chacun, indépendamment de l'autre, un groupe alkyle en C_1-C_{12}, alcoxyalkyle en C_3-C_{12}, dialkylaminoalkyle en C_4-C_{16} ou cycloalkyle en C_5-C_{12}, ou bien R_9 et R_{10} forment ensemble un groupe alkylène en C_3-C_9 ou oxaalkylène en C_3-C_9 ou azaalkylène en C_3-C_9,

R_{11} est un groupe alkyle en C_1-C_{18}, alcényle en C_2-C_{18} ou phényle,

R_{12} est un groupe alkyle en C_1-C_{18}, alcényle en C_2-C_{18}, phényle, alcoxy en C_1-C_{12}, phénoxy, alkylamino en C_1-C_{12}, arylamino en C_6-C_{12}, $-R_{24}$-COOH ou $-NH-R_{17}$-NCO,

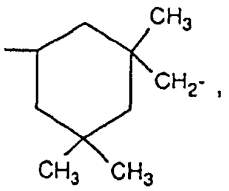
R_{13} est un groupe alkyle en C_1-C_{12}, aryle en C_6-C_{12} ou alkaryle en C_7-C_{14},

R_{14} est un groupe alkyle en C_1-C_{12} ou phényle,

R_{15} est un groupe alkylène en C_2-C_{10}, un groupe alkylène en C_4-C_{50} qui est interrompu par un ou plusieurs O, un groupe phénylène ou un groupe -phénylène-X-phénylène- où X est -O-, -S-, $-SO_2$-, $-CH_2$- ou $-C(CH_3)_2$-,

R_{16} est un groupe alkylène en C_2-C_{10}, oxaalkylène en C_2-C_{10}, thiaalkylène en C_2-C_{10}, arylène en C_6-C_{12} ou alcénylène en C_2-C_6,

R_{17} est un groupe alkylène en C_2-C_{10}, phénylène, tolylène, diphénylènemméthane ou un groupe

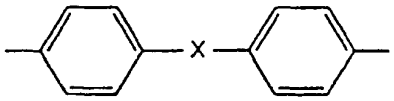


R_{18} est un groupe alkylène en C_2-C_{10} ou un groupe alkylène en C_4-C_{20} qui est interrompu par un ou plusieurs O,

R_{19} est un groupe alcanetriyle en C_3-C_{12},

R_{20} est un groupe alcanetétrayle en C_4-C_{12},

R_{23} est un groupe alkylène en C_2-C_{10}, un groupe phénylène ou un groupe



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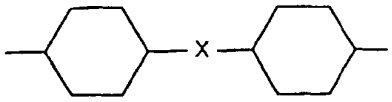


où X est O, S, SO_2, CH_2 ou $C(CH_3)_2$, et

R_{24} est un groupe alkylène en C_2-C_{14}, vinylène ou *o*-phénylène.

2. Une matière organique selon la revendication 1, dans laquelle le composé triazinique (b) est un composé de formule I dans lequel

n est 1, 2 ou 4,

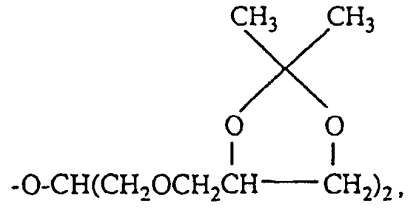
R_1 et R_2 sont chacun, indépendamment de l'autre, H ou CH_3,

R_3 et R_4 sont chacun, indépendamment de l'autre, H, CH_3 ou Cl,

R_5 et R_6 sont chacun l'hydrogène,

R_7, si n est 1, est

a) un groupe alkyle en C_1-C_{14} qui est substitué par un ou plusieurs des groupes OH, alcoxy en C_1-C_{15}, allyloxy, phénoxy, furyloxy,



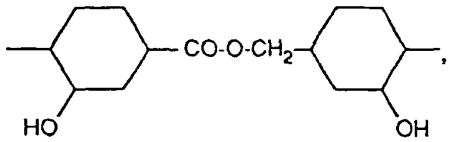
-$COOR_8$-, -$CON(R_9)(R_{10})$ et/ou -$OCOR_{11}$,

b) un groupe alkyle en C_6-C_{45} qui est interrompu par un ou plusieurs O et peut être substitué par OH et/ou un groupe glycidyloxy,

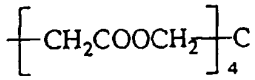
c) un groupe glycidyle ou

d) un groupe hydroxycyclohexyle,

et si n est 2, R_7 est un groupe alkylène en C_6-C_{12}, un groupe 2-buténylène-1,4, un groupe xylylène, un groupe alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O ou substitué par OH, ou bien R_7 est un groupe -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CH_2-COO-R_{18}-OOC-CH_2- ou



et si n est 4, R_7 est



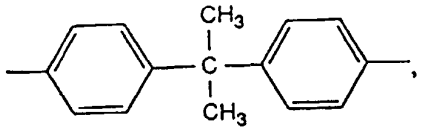
R_8 est un groupe alkyle en C_4-C_{10}, un groupe oléyle, un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH, ou bien R_8 est -$CH_2P(O)(OR_{14})_2$,

R_9 et R_{10} sont des groupes alkyle en C_2-C_6,

R_{11} est un groupe alkyle en C_6-c_{10} ou alcényle en C_2-C_3,

R_{14} est un groupe alkyle en C_1-C_{12},

R_{15} est un groupe alkylène en C_2-C_8, un groupe alkylène en C_{10}-C_{45} qui est interrompu par plus d'un O, ou est un groupe

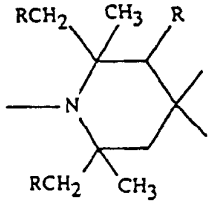


R_{16} est un groupe alkylène en C_4-C_8, et

R_{18} est un groupe alkylène en C_4-C_8.

3. Une matière organique selon la revendication 1, dans laquelle le composant (a) est un composé contenant au

moins un groupe de la formule



dans laquelle R est l'hydrogène ou le groupe méthyle, de préférence dans laquelle R est l'hydrogène.

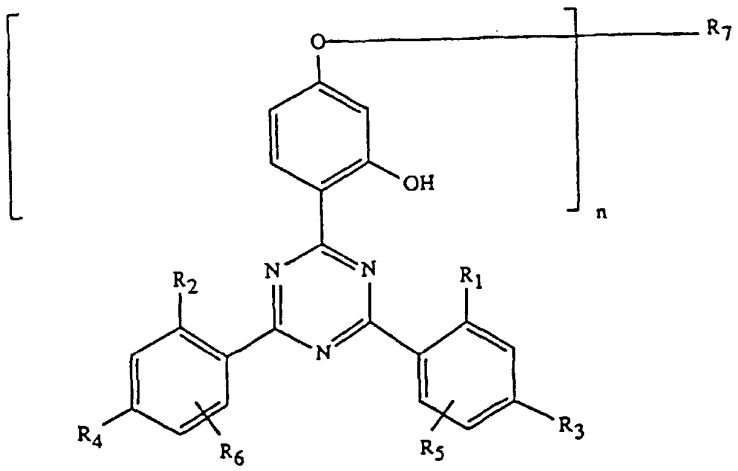
4. Une matière organique selon la revendication 1, dans laquelle la matière est un polymère organique.

5. Un polymère organique selon la revendication 4, dans lequel le polymère est un liant de revêtement.

6. Une matière organique selon la revendication 1, dans laquelle la matière est une matière de revêtement durcissable par irradiation.

7. Une matière de revêtement durcissable par irradiation contenant une hydroxyphényltriazine de formule I telle que définie dans la revendication 1, en l'absence d'une amine à empêchement stérique.

8. Une matière organique qui a été stabilisée contre une dégradation provoquée par la lumière, la chaleur et l'oxygène, contenant 0,01 à 10 % en poids d'au moins un composé de la formule Ia



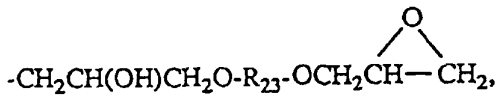
Ia

dans laquelle

n	est de 1 à 4,
R_1 et R_2	sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou trifluorométhyle,
R_3 et R_4	sont chacun, indépendamment de l'autre, H, OH, un groupe alkyle en C_1-C_{12}, cyclohexyle ou alcoxy en C_1-C_{18} ou un halogène, et, dans le cas où n = 1, peuvent aussi être un radical -OR_7,
R_5 et R_6	sont chacun, indépendamment de l'autre, H, un groupe alkyle en C_1-C_{12} ou un halogène,
R_7,	si n est 1, est

a) un groupe alkyle en C_1-C_{12} qui est substitué par un groupe phénoxy (qui n'est pas substitué ou est substitué par un groupe alkyle en C_1-C_{18}, alcoxy en C_1-C_{18} ou halogéno) ou par un groupe

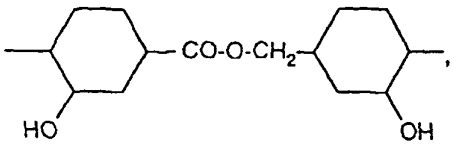
$-COOR_8$, $-CONH_2$, $-CONHR_9$, $-CON(R_9)(R_{10})$, $-NH_2$, $-NHR_9$, $-N(R_9)(R_{10})$ ou $-O-CO-R_{22}$,
b) un groupe alkyle en C_4-C_{50} qui est interrompu par plus d'un O et peut être substitué par OH et/ou un groupe glycidyloxy,
c) un groupe glycidyle ou un groupe



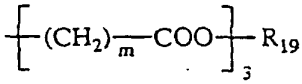
d) un groupe cyclohexyle substitué par OH ou $-OCOR_{11}$,
e) un groupe $-CH_2CH(OH)CH_2OR_{21}$
f) un groupe $-SO_2-R_{13}$,
g) un groupe $-CO-R_{12}$,

et, si n est 2, R_7 est

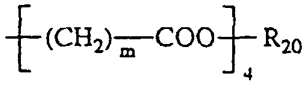
a) un groupe alkylène en C_2-C_{12},
b) un groupe alcénylène en C_4-C_{12},
c) un groupe xylylène,
d) un groupe alkylène en C_3-C_{20} qui est interrompu par un ou plusieurs O et/ou substitué par OH,
e) un groupe $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$, $-(CH_2)_m-COO-R_{18}-OOC-(CH_2)_m-$ (où m est de 1 à 3) ou



et, si n est 3, R_7 est un groupe



et, si n est 4, R_7 est un groupe



R_8 est un groupe alkyle en C_3-C_{20} qui est interrompu par un ou plusieurs O, N ou S et peut être substitué par OH, ou bien R_8 est un groupe alkyle en C_1-C_4 qui est substitué par $-P(O)(OR_{14})_2$, $-N(R_9)(R_{10})$ ou $-OCOR_{11}$, ou bien R_8 est un groupe alcényle en C_3-C_{18}, glycidyle ou phénylalkyle en C_7-C_{11},

R_9 et R_{10} sont chacun, indépendamment de l'autre, un groupe alkyle en C_1-C_{12}, alcoxyalkyle en C_3-C_{12}, dialkylaminoalkyle en C_4-C_{16} ou cycloalkyle en C_5-C_{12}, ou bien R_9 et R_{10} forment ensemble un groupe alkylène en C_3-C_9 ou oxaalkylène en C_3-C_9 ou azaalkylène en C_3-C_9,

R_{11} est un groupe alkyle en C_1-C_{18}, alcényle en C_2-C_{18} ou phényle,

R_{12} est un groupe $-R_{24}-COOH$ ou $-NH-R_{17}-NCO$,

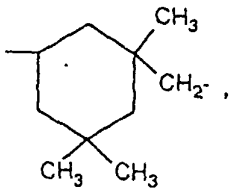
R_{13} est un groupe alkyle en C_1-C_{12}, aryle en C_6-C_{12} ou alkaryle en C_7-C_{14},

R_{14} est un groupe alkyle en C_1-C_{12} ou phényle,

R_{15} est un groupe alkylène en C_2-C_{10}, un groupe alkylène en C_4-C_{50} qui est interrompu par un ou plusieurs

O, ou bien R_{15} est un groupe phénylène ou un groupe -phénylène-X-phénylène- où X est -O-, -S-, $-SO_2-$, $-CH_2-$ ou $-C(CH_3)_2-$,

R_{17} est un groupe alkylène en C_2-C_{10}, phénylène, tolylène, diphénylèneméthane ou un groupe

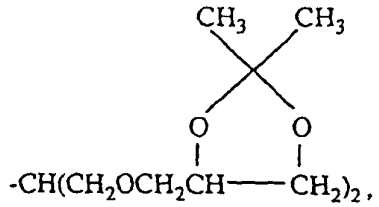


R_{18} est un groupe alkylène en C_2-C_{10} ou un groupe alkylène en C_4-C_{20} qui est interrompu par un ou plusieurs O,

R_{19} est un groupe alcanetriyle en C_3-C_{12},

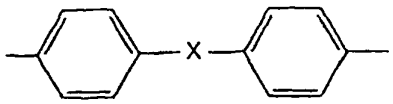
R_{20} est un groupe alcanetétrayle en C_4-C_{12},

R_{21} est un groupe alkyle en C_1-C_{18}, un groupe alcényle en C_3-C_{18}, un groupe phényle ou un groupe phényle substitué par un groupe alkyle en C_1-C_{12}, alcoxy en C_1-C_{12} ou halogéno, ou bien R_{21} est un groupe alcanoyle en C_2-C_{19}, un groupe benzoyle, un groupe alcénoyle en C_3-C_{18}, un groupe furyle ou un groupe



R_{22} est un groupe alcényle en C_2-C_5,

R_{23} est un groupe alkylène en C_2-C_{10}, un groupe phénylène ou un groupe



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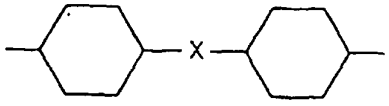

où X est O, S, SO_2, CH_2 ou $C(CH_3)_2$, et

R_{24} est un groupe alkylène en C_2-C_{14}, vinylène ou *o*-phénylène.

9. Un polymère organique en tant que matière selon la revendication 8.

10. Un polycarbonate selon la revendication 9.

11. Une matière organique selon la revendication 8, qui est une matière de revêtement durcissable par irradiation.

12. L'utilisation des composés de formule Ia de la revendication 8 comme stabilisant pour matières organiques, en particulier pour polymères organiques.

13. Utilisation selon la revendication 12, comme stabilisant pour polycarbonates.

14. L'utilisation des composés de formule Ia de la revendication 8 comme stabilisant pour matière de revêtement durcissable par irradiation.